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ORIGINAL ARTICLES

- Effects of Massage on Denervated Skeletal Muscle:
Mitzi I. Suskind, M. S.; Norma M. Hajek, B.A.,
and H. M. Hines, Ph.D. 133
- Adaptability of Present Day Concepts of Convalescent
Training and Physical Rehabilitation to the Civil-
ian Practice of Medicine. F. A. Hellebrandt, M.D. 136
- The Challenge of Crutches. V. Daily Activities on
Crutches. George G. Deaver, M.D., and Mary
Eleanor Brown, M.A. 141
- Twenty-Eighth Annual Hospital Standardization Report 157
- Malpractice: Simultaneous Application of Tight
Bandaging and Heat to Arthritic Foot. 159
- Cervical Periarthritis Diagnosis and Treatment. W.
J. Zeiter, M.D., and F. B. House, M.D. 162
- Medical News 166
- Editorials 167
- Correspondence 175
- Book Reviews 177
- Physical Medicine Abstracts 180

EDITOR OF THE MONTH

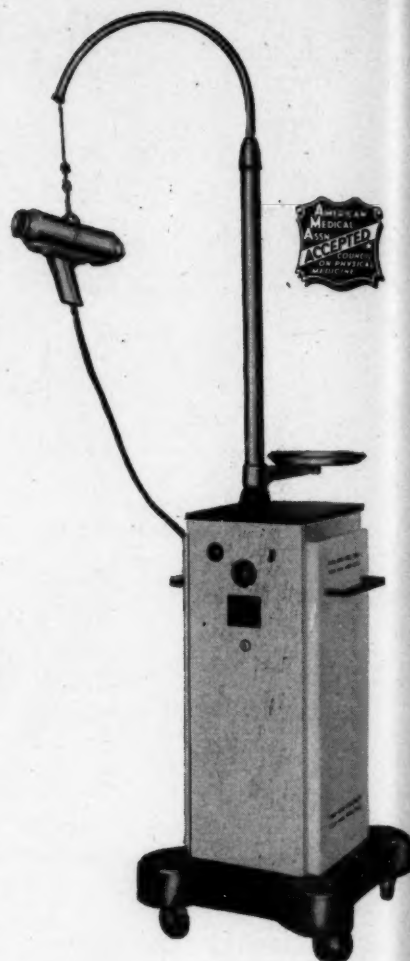
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EFFECTS OF MASSAGE ON DENERVATED SKELETAL MUSCLE

MITZI I. SUSKIND, M.S.

NORMA M. HAJEK, B.A.

and

H. M. HINES, Ph.D.

IOWA CITY

Massage, either alone or in combination with other types of therapy, has been extensively employed in the treatment of paralyzed muscles. However, there is a paucity of information concerning the mode of action and the efficacy of this type of therapy in the treatment of such muscles. Langley and Hashimoto¹ and Hartman and Blatz² observed only slight or questionable benefits from massage in the treatment of denervated muscles of rabbits. Chor and co-workers³ concluded from their work on the gastrocnemius muscles of *Macacus rhesus* monkeys that, while massage did not decrease the rate of weight loss following denervation, it did enable the muscle to return to normal more rapidly on reinnervation. In our study, quantitative evidence was sought concerning the extent to which massage might delay muscular atrophy and facilitate neuromuscular regeneration. In addition, experiments were carried out to permit a comparison of the relative effectiveness of electrical stimulation and massage on denervated muscles of the same species.

The studies were carried out on the gastrocnemius muscles and tibial nerves of adult cats. The general plan was to denervate the gastrocnemius muscles of both limbs, by either sectioning or crushing their tibial nerves. The former operation was performed when only atrophy was desired and the latter when both atrophy and the subsequent regeneration of the muscles were to be studied. The muscle of one limb was massaged and the muscle of the contralateral limb served as its untreated control.

The effects of daily periods of electrical stimulation on muscular atrophy in cats also were determined. Denervation of both gastrocnemius muscles was accomplished by tibial nerve section. The muscle of one limb was treated with strong induction shocks for two minutes each day for a period of twenty-eight days after denervation. The nonstimulated denervated gastrocnemius muscle of the contralateral limb served as a control. Although our preliminary studies showed that there was no significant difference between the weight of the right and of the left gastrocnemius muscle of the cat, we followed the plan of alternating sides for control and for experimental muscles.

Each animal received massage for two five-minute periods daily. The massage consisted of petrissage and effleurage motions. Each period of treatment started and ended with effleurage. Petrissage and effleurage were used alternately in the midperiod. Although the massage was applied to the whole hind limb, motion over the gastrocnemius muscle was emphasized.

Measurements of the strengths and weights of the control and massaged

* From the Department of Physiology, State University of Iowa.

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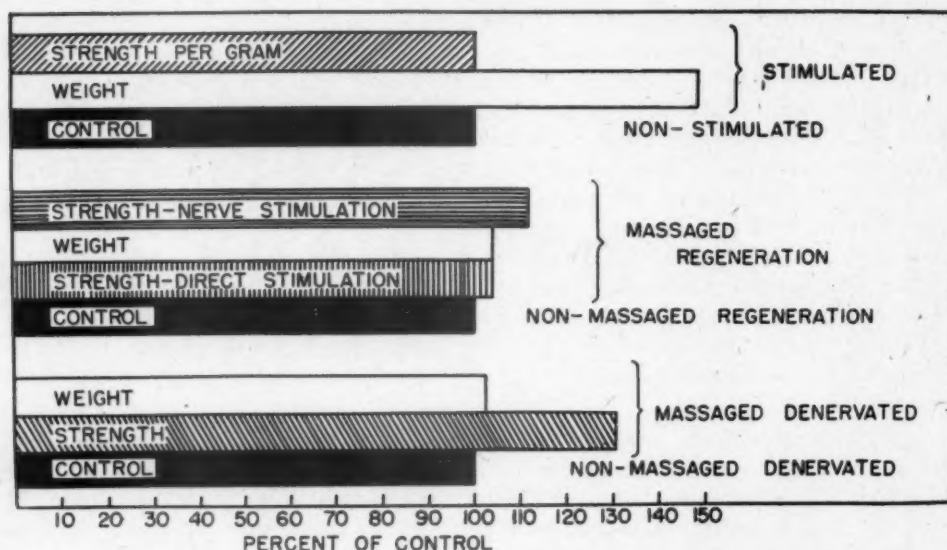
1. Langley, J. N., and Hashimoto, M.: Denervated Muscle Atrophy, *J. Physiol.* 52:15 (April) 1918.

2. Hartman, F. A., and Blatz, W. E.: Treatment of Denervated Muscle, *J. A. M. A.* 74:878 (March) 1920.

3. Chor, H.; Cleveland, D.; Davenport, H. A.; Dolkart, E. R., and Beard, G.: Effects of Physical Therapy in the Monkey Following Section and Suture of Sciatic Nerve, *J. A. M. A.* 113:1029 (Sept.) 1939.

muscles were made twenty-eight days after nerve section and either twenty-five or forty days after crushing of the tibial nerves. Muscle strength was determined by measuring the maximal isometric tension response to volleys of slightly supermaximal stimuli applied directly to the muscles and, in addition, to the tibial nerves in the regeneration experiments. The frequency and intensity of the stimuli employed were those found to give maximal tension responses. The achilles tendon was cut and attached to a Blix torsion rod. A portion of the femur was exposed and fixed in a rigid clamp. At the conclusion of the strength measurements the gastrocnemius muscles were carefully dissected out and weighed.

Results



Graph showing average values for the effects of massage and electrical stimulation on muscular atrophy and regeneration. The black bars represent average values on untreated denervated contralateral control muscles expressed as 100 per cent.

Average values from experiments on 16 cats in which the tibial nerves were sectioned and on 10 cats in which the tibial nerves were crushed and allowed to regenerate are presented in the accompanying chart. The denervated muscles which received massage were heavier and stronger than their untreated contralateral controls. The effect on muscle weight was slight but statistically significant. The greater strength of the massaged muscles was due only in a small measure to their larger mass. The chief effect must be attributed to a greater contractile strength per unit mass of muscle. Massage in some way served to lessen the gradual loss of contractile strength which occurs in skeletal muscle after denervation. However, when the massage was continued into the periods of reinnervation and regeneration the differences in strength between the treated and the untreated muscles tended to be equalized. There was no significant difference between the isometric tension responses to nerve stimulation of the treated and those of the untreated muscles. This indicates that massage neither enhanced nor impeded the progress of reinnervation. Our findings suggest that the physiologic changes following reinnervation result in a prompt improvement in the functional state of the contractile mechanisms. The denervated muscles which had received daily treatments with electrical stimuli were found to be heavier and stronger than their untreated controls. However, this increase in strength can be entirely accounted for by the larger

muscle mass. Unlike massage, electrical stimulation (see chart) was effective in retarding the weight loss from denervated muscle but did not lessen the gradual loss of contractile strength per unit mass of tissue.

Comment

The loss of strength in skeletal muscle following denervation is due in part to the smaller size of the muscle fibers and in part to a decreased capacity of the muscle fiber per unit of mass to develop tension. Electrical stimulation under conditions which permit maximum tension development preserves a larger mass of contractile tissue by retarding atrophy, but fails to check the gradual loss of strength per unit mass of tissue which occurs in muscle after denervation.⁴ Massage proved to be ineffective in the retardation of atrophy but exerted a beneficial effect on the functional state of the contractile mechanisms. These findings suggest that an optimal regimen for the treatment of paralyzed muscle would be a combination of electrical stimulation and massage. The former would serve to maintain the mass and the latter to maintain the functional state of the muscle.

Our studies offer little evidence as to the mechanisms involved in the beneficial effects of massage. It should be pointed out that in our experiments, because of the loss of vasomotor innervation and the supporting forces of muscle tone and phasic contractions, conditions were favorable for the development of vascular and lymphatic stasis. However, direct evidence is lacking as to whether the better functional condition of the massaged muscles should be attributed to a relief from stasis.

Summary

Experiments concerning the influence of massage on muscular atrophy and neuromuscular regeneration were carried out on denervated gastrocnemius muscles of cats. Massage caused only a slight retardation of the weight loss but proved to be effective in maintaining the strength of denervated muscle. Electrical stimulation retarded weight loss but exerted no effect on the contractile strength per unit mass of muscle. The differences between the weight and the strength of massaged and nonmassaged muscles tended to be equalized when the treatments were extended into the periods of reinnervation and regeneration. The findings suggest that an effective therapy for the treatment of paralyzed muscles would be a combination of electrical stimulation and massage.

4. Wehrmacher, W. H.; Thomson, J. D., and Hines, H. M.: Effect of Electrical Stimulation on Denervated Skeletal Muscle, *Arch. Phys. Med.* 26:261 (May) 1945.



ADAPTABILITY OF PRESENT DAY CONCEPTS OF CONVALESCENT TRAINING AND PHYSICAL REHABILITATION TO THE CIVILIAN PRACTICE OF MEDICINE *

F. A. HELLEBRANDT, M.D.

RICHMOND, VA.

Much occurred to enhance the importance of physical therapy during the war years. The most rapidly advancing of the various branches of physical medicine is the one concerned with convalescent training and physical rehabilitation. This recent interest may be explained in several ways. First, the manpower shortages of the war epoch. For the first time in history manpower shortages were so acute as to make it necessary to utilize the residual capacities of the disabled. Second, the high incidence of disabling injuries among soldiers surviving serious battle wounds by virtue of modern methods of transport and treatment. The nation as a whole seems to be alive to the special obligations of the medical profession in the restoration of these men to an independent and self-sustaining status in society. As Shands has said,¹ disabled veterans returning to their home communities are commanding the interest of every physician and layman. Consequently it is most important that all physicians have an accurate knowledge not only of the nature of service-connected disabilities but of the existence of effective measures for their reconstruction.

Third, recent advances in the utilization of various methods of hastening convalescence. These were introduced by the British² and subsequently adopted in this country. The everyday activities of the convalescent hospitals of the Army Air Forces and the reconditioning units of the army and navy have since been so widely dramatized³ that an informed public will almost certainly demand of the private physician and the civilian hospital the forms of therapy which seem to have accomplished much in expediting recovery from war injuries. Fourth, a new concept of the point at which medical responsibility for the welfare of the patient ceases. In their traditional roles, medicine and surgery are almost wholly concerned with getting the patient over the acute period of his disease or injury. Thus a hiatus exists between the termination of medical attention and the real necessities of many patients. The transformation of a physically disabled person into a useful member of society cannot be left to chance. It can be achieved only as the result of a careful plan in which the physician plays a dominant role, especially during the early stages of rehabilitation. In this he is assisted primarily by the physical and occupational therapist. When maximum physical reconstruction has finally been attained, the physician plays a less active part, while the vocational guidance and training experts initiate the steps necessary for placement of the disabled person in a job which will make him as nearly self supporting as his residual disability

* From the Baruch Center of Physical Medicine, Medical College of Virginia.

1. Shands, Alfred R.: Physical Reconstruction in Orthopedic Disabilities, S. Clin. North America (April) 1945, p. 418.

2. Ministry of Health and Scottish Office: Final Report of the Inter-Departmental Committee on the Rehabilitation of Persons Injured by Accidents, London, His Majesty's Stationery Office, 1939. Rehabilitation in Great Britain, British Information Services, January, 1944.

3. De Seversky, Alexander P.: I Owe My Career to Losing a Leg, *Ladies' Home Journal*, May, 1944. Deutsch, Albert: Army's Reconditioning Program Cuts Down Sick Time in Hospitals, *PM*, Oct. 13, 1943. Maisel, Albert Q.: Out of Bed—Into Action, *Reader's Digest*, December, 1943. Reynolds, Quentin: They'll Fight Again, *Collier's*, Oct. 21, 1944. Rusk, Howard A.: Teamwork for Reconstruction; The Contribution of Medicine, *New York Herald Tribune Forum*, Oct. 16, 1944.

permits. Recent years have brought the realization that it is the physician who is in the best and most natural position to give that continuity to the management of the patient which is so important to the attainment of maximal physical restoration.

The fifth and final reason for the current interest in rehabilitation is the gradual development of a sense of social responsibility for the welfare of the disabled. The 1943 amendments to the Vocational Rehabilitation Act permit the purchase,⁴ under a federal-state program, of extensive medical and surgical services for that physical restoration of the disabled which must precede the initiation of retraining for work. The paradox lies in the fact that in most communities the necessary medical services cannot be purchased because the average civilian hospital provides neither the physical facilities nor the trained technical personnel necessary to give to the civilian handicapped person the kind of reconstruction help which has been so abundantly available in the armed forces. Before civilian convalescent training and rehabilitation centers can become a practical reality, an estimate must be made of the adaptability of these newer trends in therapy to the communities' local needs and of the responsibility of medical schools for provision of this type of service in the teaching hospitals of the country.

In the years following the First World War there appeared to be manpower enough to accommodate easily the needs of ordinary living, and the medical literature records no concerted effort to salvage the disabled as promptly as possible. It is a curious and perhaps significant fact that for some time prior to the onset of the war just ended there was a rapid evolution of European training programs aimed specifically at national fitness and the conservation of manpower.⁵ These attracted sufficient attention for the Health Committee of the League of Nations to appoint an international commission to make a survey of the practices of various countries in this field. Apparently enough was already being done to mobilize the physical resources of various national groups to warrant the proposal of an extensive League-sponsored scientific investigation. At about this time the British government placed before parliament certain recommendations for physical reconditioning, but before these could be instituted on a national scale the exigencies of the war made survival a problem of such grim reality that emergency medical services had to be established to cope with the British rehabilitation problem. These soon demonstrated that existing personnel and facilities were woefully inadequate. Prolonged invalidism after accidents, illness and injuries was an industrial and military waste which could be ill afforded. It was, as a matter of fact, imperative that a maximum number of casualties be saved, returned to active duty or specifically trained to assume a useful place in industry. Thus it was the manpower shortages of the early years of the war which precipitated serious consideration of the scientific and technical problems involved in reconditioning the disabled. Eventually these served to widen the whole concept of rehabilitation, setting the pattern now familiar to those who have maintained contact with the development of American and British war medicine.

From the onset of the emergency there was ample appreciation on the part of the British medical profession of the need for specialized training in these virtually unexplored fields of medical practice. Thus the centers of physical medicine established under the aegis of the Baruch Committee in 1944 are the expression of a trend which had already made itself felt in other parts of the world.

4. Shortley, Michael J.: Vocational Rehabilitation in New Perspective in, *Symposium on the Processes of Rehabilitation*, The National Conference of Social Work, Cleveland, Ohio, May 25, 1944.

5. Hellebrandt, F. A.: Medical Implications of the British National Fitness Campaign, *War Med.* 2:230 (March) 1942.

Early in the war the British Ministry of Health asked all the principal hospitals in England and Wales to develop facilities for the rehabilitation of patients. Included in these were the ordinary and well known measures long used by the physical therapist in the more acute stages of recovery from injury or disease; facilities for occupational therapy, and facilities for remedial exercise. Great stress was placed by the British on the physical training aspect of the rehabilitation program. A decade and a half ago, Percy Dawson initiated a study at the State of Wisconsin General Hospital of the value of exercise in hastening the convalescence of surgical patients.⁶ This study demonstrated in a small way the benefits which might accrue from a program of judiciously prescribed postoperative exercise graded in severity. The same experiment has since been performed on a large scale in army hospitals and reconditioning centers on both sides of the Atlantic.

The British taught us that the first stage of reconditioning begins as soon as the patient is assigned to a hospital bed.⁷ The whole man must be kept fit. There is no valid reason why uninvolved parts should be allowed to deteriorate through disuse because regional areas demand rest. The final stage is carried out at the convalescent depot. This rehabilitation center is remote from the general hospital. The Royal Air Force was quick to accept the principle of special rehabilitation centers in which each day is fully occupied with an organized program of physical work and educational and diversional activities.

By 1944 all army general hospitals in the United States and many station hospitals had organized and equipped reconditioning units patterned closely on the British scheme, and special convalescent hospitals were activated for combat casualties of the Army Air Forces.⁸ Their objective was to return more men to duty in less time and while doing this to have the men use profitably the days spent in the hospital. The benefits derived from these programs are now too familiar to require comment. Though they are difficult to evaluate critically, one would have to be skeptical indeed to deny that sufficient good appears to be inherent in these attempts at hastening convalescence to justify their extension into civilian practice.

The year 1918 saw the demobilization of men from the armed forces at a time when little or no preparation had been made to provide medical care for those who carried into civilian life disabilities resulting from their service. It is too early to predict what will happen this time. One of the hopeful signs is the fact that the rehabilitation facilities in the emergency medical service hospitals in England aroused so much interest throughout the country that a special memorandum was published by the Ministry of Health to advise civilian hospital authorities concerning the steps which should be taken to organize permanently along similar lines. To quote from the introduction to the memorandum:⁹

The organization of the Emergency Hospital Scheme has given a great impetus to the development of rehabilitation. At the same time the necessities of the war have emphasized the need for restoring patients to their full working capacity as efficiently and speedily as possible. But the problem is by no means confined to the war period or to the classes of patients for whom provision has been made under the war-

6. Carns, Marie L.: *Medical Aspects of Physical Exercise*, Thesis, University of Wisconsin, 1927.

7. Ministry of Health and Scottish Office: *Report of Inter-Departmental Committee on the Rehabilitation and Resettlement of Disabled Persons*, London, His Majesty's Stationery Office, 1942. MacLay, W. S., and Stokes, A. B.: *Second Report on the Work and Organization of an Emergency Medical Service Neurosis Centre*, London, Warden & Co., Ltd., 1943.

8. Thorndike, Augustus: *Convalescent Reconditioning*, J. A. M. A. 126:773 (Nov. 18) 1944. Rankin, Fred W., and Barton, Walter E.: *Present Status of Rehabilitation in the United States Army*, *ibid.* 125:256 (May 27) 1944. Rusk, Howard A.: *The Army Air Forces Convalescent-Rehabilitation Training Program*, J. Indianan State M. A., 36:649 (Dec.) 1943; *The Army Air Forces Convalescent Training Program*, Southern M. J. 38:12 (Jan.) 1945; *Convalescent Care and Rehabilitation in the Army Air Forces*, M. Clin. North America (May) 1945, p. 715.

9. *The Organization of a Hospital Rehabilitation Department*, Emergency Medical Services Memorandum No. 6, London, His Majesty's Stationery Office, 1943.

time hospital scheme. It is no less important as a permanent factor in hospital organization and affects all kinds of patients.

The program proposed by the British Ministry of Health is worth summarizing, since civilian hospitals are now confronted with the necessity of determining their responsibility for the establishment of rehabilitation services as a part of their physical medicine programs. The British scheme is, in fact, a blueprint based on acceptance of the principle of adaptability. Its main points follow: First, the introduction of methods of physical rehabilitation into every ward, modified to meet individual complaints and stages of recovery and commencing on admission of the patient or as soon afterward as possible. Second, the planning of convalescence with a view to speeding up the recovery of both physical and psychologic function, thus hastening the patient's return to full activity. Third, the adoption of appropriate forms of rehabilitation therapy, not only for nearly all types of inpatient disability but for selected groups of outpatients whose recovery would be facilitated by such means. Fourth, placement of the various activities connected with rehabilitation under the personal supervision of a single member of the medical staff. Continuous informed medical guidance is considered essential to the success of the program. This in no sense interferes with the continuity of control exercised over the individual patient by the original physician who orders rehabilitation therapy, for the medical supervisor of the rehabilitation unit must work in close association with all referring services.

It goes without saying that the reconditioning and convalescent training programs of the armed forces cannot be adopted in toto by civilian hospitals. They were designed to fit the special needs of strong and healthy young men suffering primarily from traumatic lesions of the locomotor apparatus. Furthermore, it is the homogeneity of the military load which has lent itself so admirably to the development of economical group treatment technics.

The principle of separation of the rehabilitation center from the hospital, so important in the armed forces, is much less urgent in civilian practice and, furthermore, has many serious limitations. Even a well organized civilian curative workshop is in no sense comparable to the army convalescent depot, because it does not have assigned to it a residential medical staff. Much more might be accomplished if the curative workshop were made a part of a general hospital, with a physical medicine specialist in constant attendance, and in direct contact with all referring physicians, additional consultants being called according to the needs of each patient.

There are at least three limitations to the establishment of a rehabilitation center in a civilian hospital. The major one is that of suitable space. The provision of personnel has been a second limitation, soon to be relieved by the discharge of corpsmen, physical and occupational therapists and remedial exercise experts from the armed forces. Few civilian physical therapists have been trained adequately in rehabilitation technics. This is one of the most serious limitations and must be remedied gradually by in-service training. The third limitation is initial capital expenditure for adequate equipment. The principle that it is economical to provide equipment, space and personnel for hastening the recovery of the injured workman has been demonstrated by the Workmen's Compensation Board of the Province of Ontario, Canada, and is now attracting the active interest of insurance groups.

It is probably insufficiently appreciated by hospital administrators that most physical therapy departments not only pay their own way but in well organized hospitals serve as one of the few income-producing units. The Institute of Medicine of Chicago recently estimated that 75 per cent of all chronically ill patients in the Chicago area can pay a part or all of the costs

of their care.¹⁰ The handicapped who cannot pay are eligible for assistance under the Vocational Rehabilitation Act. However, before this revenue-producing reservoir can be tapped, the type of facility necessary for the planned reconversion of the residual capacities of the disabled into useful self-sustaining channels must be established. There are those who believe this cannot be done without the development of special chronic disease hospitals separate from those which serve the acutely ill. An alternative worthy of serious consideration is the organization of an intermediate type of service in the form of a special rehabilitation ward in which the handicapped are systematically trained to assume responsibility for independent daily living. Deaver has found that satisfactory rehabilitation cannot be done in the regular wards, where the nursing personnel is accustomed to doing many things which the patient should be taught to do for himself.¹¹ An adequate home treatment program for a severely handicapped person facing a lifetime of disability cannot be outlined in one easy lesson immediately before his discharge from the hospital. It requires painstaking reeducation of a highly specialized type and calls for adequate space, time and skilled personnel.

Perhaps the most important step in the return of the disabled to a self-sustaining economic status is resettlement in industry. Vocational assessment, guidance and training are obviously useless without adequate placement, selective in type. Though rarely considered a medical responsibility, successful resettlement in industry can never be attained without the solution of many challenging biological problems. Before the substandard employee can be placed in a position where he can safely do an efficient day's work, we must know more than we now do about disability evaluation, the biomechanics of job skills, the physiology of motor learning and the assessment of physical fitness. We must know the cost to the man of a variety of occupations. The job itself must be studied from a biological point of view, so that if necessary it may be adapted to the capabilities of the handicapped. Observation of disabled men and women at work shows how adaptable the human machinery is and how great its capacity for adjustment if the individual is given an opportunity to develop compensatory skills. What can be done in this sphere is admirably illustrated in the sheltered workshops of the Goodwill Industries. Convalescent training and rehabilitation centers would do well to utilize such facilities and thus give an opportunity of continual medical guidance to the chronically ill and disabled in all phases of the restorative process. Further, by dovetailing these efforts with those of the various state divisions of vocational rehabilitation, disabled persons entering civilian hospitals or outpatient clinics might be rendered employable more quickly, either in a sheltered workshop or in competitive industry. Knowledge as to how much can be done to improve the general physical and mental fitness of injured men during hospitalization and thereafter is one of the outstanding contributions of war medicine, and it is our duty to incorporate that which is applicable to the enlightened practice of civilian medicine.

10. Some Basic Questions Related to the Development of Community Services for the Chronically Ill, The Institute of Medicine of Chicago, Committee on Basic Community Plan, December, 1944.

11. Deaver, George G.: Personal communication to the author.

THE CHALLENGE OF CRUTCHES

V. Daily Activities on Crutches

GEORGE G. DEEVER, M.D.

Medical Director, Institute for Crippled and Disabled

and

MARY ELEANOR BROWN, M.A.

Physical Therapy Technician, Institute for Crippled and Disabled

NEW YORK

This chapter outlines methods of walking backward and sideward, turning, opening doors, passing through them and closing them again; sitting down and getting up from chairs; ascending and descending ramps, stairs and curbs; getting down and up from the floor; falling; obstacle clearing, and picking up and carrying objects. These are the daily activities so often forgotten in the enthusiasm of learning to stand upright and advance forward. They are far more difficult than propelling one's self forward, and the prospective crutch walker should be forewarned of this next chapter on his road to independence.

Here again is virgin territory. Almost nothing has been written concerning the use of crutches for everyday activities. Yet the average person's life requires so much more than simply advancing forward. How have disabled people learned to accomplish the more complicated activities, such as coming to a standing position, climbing stairs and crossing streets? The answer has been, by dint of trials and errors. In this chapter the methods of the disabled themselves are analyzed in order to establish a starting point for further study and perfection of crutch mechanics as applied to daily activities. The authors' thanks go to the many disabled persons who patiently performed daily activities over and over again as their methods were analyzed step by step and recorded.

Crutch methods for such complicated activities as climbing a 6-inch curb or getting up from the ground cannot be devised by normal persons who sit down with muscle charts and proceed to work out a hypothetical plan. The human being has over two hundred bones and four hundred muscles and a good many more joints where bone moves against bone. In addition, there are the infinitely complicating effects of the nervous and glandular systems, so that what a person appears to have with regard to muscular power and bone structure does not always correspond to what he can do. It is a common paradox that Mr. A., an extremely disabled person, performs daring, remarkable and seemingly impossible feats, as compared with the awkward, fearful maneuverings of Miss B., who gives every evidence of having the mechanical equipment. Thus do the intricate and intangible qualities of character, temperament, courage and personality enter into these daily acts, just as they do in all human behavior. Human beings are too unique and variable for purely mechanical rules to hold. Therefore, the very acts achieved on crutches must be studied rather than merely the mechanical possibilities.

The logical way to study the daily activity problem is to choose those disabled persons who perform daily activities fast, efficiently and with grace and to analyze their step-by-step methods. This procedure, in fact, should be a part of standard record routine. The analyses should contain name, date, disability, extent of disability and appliances. These analyses should

be filed by disability so that when others having a similar disability arrive for instruction the previously collected technics may be tried.

The step-by-step analyses which follow have been based on just such a procedure. It is felt, however, that with more methods at hand the ones selected for recommendation can be more valid. In fact, with sufficient data of this type a chart of prescriptions for daily activity technics, by disability, could be made, similar to the chart for prescribing gaits for orthopedic disabilities.¹

The necessity of having an inventory of a subject's daily activity ability has been discussed elsewhere.² Each newcomer needs to be put through a daily activity test to show objectively his status with regard to locomotion and travel, self care and use of the hands in everyday activities. The results of the test show the activities he needs to learn. If, for instance, the subject can do everything but get up from the floor, the instructor should indicate the need for learning to do this. Since it is undesirable to impose a method on a disabled person, the subject should be led to the floor and aided in experimenting by himself. Only after he has tried and knows that he needs suggestions is it advisable to go to the file and obtain methods employed by others.

The way to learn the methods outlined in this chapter is to take a pair of crutches, adjust them as indicated in previous articles and set about following the arduously dissected procedures and using the necessary apparatus, that is to say, climbing stairs if stair climbing is being studied. In fact, investigators should experiment not only with crutches but with braces. Ideally, every teacher should have his own long double knee-locking braces on a pelvic band and wear them to see at first hand what the difficulties are. Since braces are scarce and such a plan at present is not feasible, an alternative is to make a collection of discarded braces of all kinds, select the ones which come the closest to fitting and experiment with them. Such a "brace museum" is invaluable not only for the purpose described but for teaching and demonstrating the various kinds of braces.

Daily Activity Methods

A. Walking Backward

Walking backward is a necessary daily activity, as it may be the only means of getting out of the way of a suddenly approaching object or person. Many doors open outward, that is, toward the subject, so that he has to step back as he pulls the door toward him. Walking backward becomes especially important when space is limited, as in public bathrooms.

Four backward gaits which are used commonly by crutch walkers are as follows:

Backward Gait No. 1. — This gait is used by subjects who can take steps backward with the two lower extremities separately.

- (a) Left foot back.
- (b) Right crutch back.
- (c) Right foot back.
- (d) Left crutch back.

Backward Gait No. 2. — Since this is a backward swinging-through gait, it can be performed by those who have mastered the forward swinging-through gait; in other words, by those who can raise the body off the floor.

- (a) Raise both crutches off floor and put them down immediately back of body.
- (b) Press down on crutches and with weight on hands straighten elbows and raise body off floor, moving it backward beyond crutches.

Backward Gait No. 3. — This is used by those who cannot do the swinging-through gait

1. Deaver, George G., and Brown, Mary Eleanor: The Challenge of Crutches: IV. Prescribing Crutch Gaits for Orthopedic Disabilities, Arch. Phys. Med. 26:747 (Dec.) 1945.

2. Deaver, George G., and Brown, Mary Eleanor: Physical Demands of Daily Life: Scale for Rating the Orthopedically Exceptional, New York, Institute for the Crippled and Disabled, 1945.

in reverse because of difficulty in keeping balance when the crutches are behind the body.

(a) Place crutches next to feet.

(b) Press down on crutches and raise body backward.

Backward Gait No. 4. — This is another gait which may be employed if neither lower extremity can be moved and it is not possible for the subject to place the crutches either behind him or next to his feet, as in Backward Gait No. 3.

(a) With crutches slightly in front of body, push down on crutches and raise body backward.

(b) Move crutches backward but always keep them ahead of body.

In all backward gaits, the crutches may be moved separately or simultaneously, time being saved if they are moved together. When it is a question of lifting the body, it may be lifted to clear the floor or slid along the floor, according to the circumstances and the ability of the subject.

B. Walking Sideward

Walking sideward is a necessary daily activity because this is the only method of progressing through narrow spaces, as between rows of theater seats and church pews, along crowded bus and subway aisles and through crowds. It is advisable to be able to move sideward in both directions, since turning around in order to favor walking in one direction might be difficult if not impossible.

Three methods are as follows:

Sideward Gait No. 1. — This is used by subjects who can move the two lower extremities separately.

(a) Right crutch to right.

(b) Right foot to right.

(c) Left foot to right.

(d) Left crutch to right.

Sideward Gait No. 2. — Those who can raise the body off the floor can use this method.

(a) Advance one crutch across body in front.

(b) Press down on crutches, raising body and swinging it sideward.

(c) Move other crutch sideward following body.

Sideward Gait No. 3. — Those who can raise the body off the floor can use this method. It differs from Sideward Gait No. 2 only in that the two crutches are used together.

(a) Raise both crutches at once and place them to one side of body, one crutch partly crossing body in front.

(b) Take body weight on crutches and move it sideward.

C. Turning Around

Turning around is an important daily activity because changing direction or getting out of the way of a person or moving object is often necessary. Two methods are as follows:

Turning Gait No. 1. — Those who can raise the body off the floor can use this method:

(a) Place one crutch on floor to one side and a little behind body and the other across and a little in front of body either simultaneously or separately, thus beginning to turn.

(b) Push down on crutches with hands, raise body, turn it in the direction in which crutches were moved and place it down on floor again.

(c) Quickly adjust crutches so that balance is certain. (This instruction has been inserted for severely disabled persons, such as those with spinal cord injuries, who lack balance. This adjustment becomes necessary if the crutches are too near to the person to furnish sufficient balance, in which case they should be lifted and placed farther away.)

(d) Repeat until a full turn has been made.

At first many small steps may be taken with this method, until a full turn has been accomplished. Then quarter turns may be tried and finally half turns.

Turning Gait No. 2. — This method is used by those who cannot raise the body off the floor.

(a) Place one crutch on floor to one side and a little behind body and the other across and a little in front of body, either simultaneously or separately, thus beginning to turn.

(b) Pivot body on feet or slide feet in direction in which crutches were moved.

(c) Adjust crutches so that balance is certain.

D. Opening and Closing Doors

Opening and closing doors are necessary daily activities because doors must be managed at the entrances of buildings, between rooms and in public bathrooms. This activity presents real difficulty when crutches and canes are used. Doors may open inward toward the subject, in which case they need to be pulled as the subject moves backward, or they may swing out away from the subject and require pushing as the subject advances through the doorway.

A method of opening a door which opens away from the subject is as follows:

Door-Pushing Method. —

- (a) Approach door and get as close to it as possible.
- (b) Balance on both crutches and both feet sufficiently well so as to be able to take hand nearer door handle off crutch, grasp and turn door handle.
- (c) Push door open.
- (d) Move one crutch forward so as to prop door open and keep it from swinging shut.
- (e) Begin to advance through open door.
- (f) Push door again.
- (g) Move crutches and keep advancing through door until it has been cleared and may close.

The difficulties lie in getting close enough to the door on approaching it and then clearing the door sill in the process of advancing through the doorway.

A method of opening a door which must be drawn toward the subject is the following:

Door-Pulling Method. —

- (a) Approach door and stand to one side so door can be pulled open.
- (b) Balance on both crutches and both feet sufficiently well so as to be able to take hand nearer door handle off crutch, grasp and turn door handle.
- (c) Pull door strongly inward toward self and quickly place one crutch against door to keep it from closing.
- (d) Advance through open door, propping door with crutch and body until doorway has been cleared and door may close.

E. Sitting Down and Getting Up From Chairs

Sitting down and getting up from chairs are necessary daily activities because chairs are standard pieces of furniture and by custom serve for resting the body from standing upright.

Chairs differ in size, shape and weight. Some are higher than others. Easy chairs are usually lower. Backs may be low, high, straight or slanting. Seats may be narrow, shallow, wide, deep or slanting. Chairs may have two arms. Some types of school chairs have one arm. Other chairs have rungs which prevent placing of the feet underneath the seat. Easy chairs come down vertically to the floor in front, allowing no space for placing the feet back.

Getting up from a chair or off a bed is one of the most important daily activities for the disabled subject because he has to be able to do this by himself if he is going to be independent in walking. In fact, Miss Wilhelmine Wright³ said, "I even think that it is unjustifiable to advise any attempt at walking unless the patient has a fair chance of some day being able to get out of a chair also." Our opinion is that standing and walking have such great value as exercises and for building strength, to say nothing of morale, that they justify themselves even if it is likely that the subject may not be able to get out of chairs independently. Mechanisms have been devised to aid persons to arise from wheelchairs. It is fair to predict that with continued success in the rehabilitation of the severely disabled, more

3. Wright, Wilhelmine G.: Crutch-Walking as an Art, *Am. J. Surg.* 1:372 (Dec.) 1926.

ways and means will be devised to aid them toward independence and what appears now to be impossible may some day be so commonplace as to be taken for granted.

Getting out of chairs is one of the hardest of all daily activities to perform, since it requires hoisting the body weight from a low bent position to a higher erect position. Sitting down and getting up from chairs can be performed in many different ways. The particular methods are governed by the disability of the subject as well as the braces and crutches or canes which he has to use. The general principle to follow, if possible, which applies to all persons, is to place one foot underneath the seat of the chair before coming to a standing position. Many persons tend to overlook this principle and, in fact, seem to make a special effort to place both feet as far away from the chair as possible and then attempt to hoist themselves from the chair while having no purchase for their effort. However, the need for braces, or other disability characteristics, may prevent the subject from placing one foot under the chair, and it is for this reason that the following methods are suggested.

If a chair is against the wall, it is much simpler to manage, since it need not be steadied. If the chair has arms the subject usually has less difficulty. Generally, low chairs are harder to learn to manage than high ones. Platforms may be used under chairs to make them higher. These may be gradually lowered as the subject progresses. Large easy chairs are usually low, and their softness imposes further handicaps, since the subject never knows just where the firm part is.

The subject should learn first how to manage armchairs against the wall and then away from the wall and, finally, ordinary straight chairs without arms placed in the center of a room.

Various methods of sitting down and getting up from chairs will be listed.

Chair-Sitting-to-Standing Method No. 1. — This method is used by those with long double leg braces which lock at the knee.

- (a) Lean crutches against chair or in convenient place for grasping them.
- (b) Move toward front edge of chair.
- (c) Lock one knee.
- (d) Cross foot of locked extremity over other foot.
- (e) Place hands on chair seat to side of body opposite to knee that has been locked and turn body toward that side far enough to permit grasping chair seat with one hand on each side, thus almost facing straight backward.
- (f) Push down on chair seat, straightening elbows, thus raising body off chair, and at same time turn in direction of hands and toward chair back, thus facing it.
- (g) Climb up back of chair with hands. (At this point the subject faces seat and chair back with trunk bent forward at hips, one brace locked at knee and the other unlocked.)
- (h) Lock second knee either by pushing it back strongly with a hand or snapping it backward by a trunk and lower extremity movement until it locks itself.
- (i) Place crutches under arms one at a time, shifting body weight from chair to crutches and bringing trunk upright.

Having one lower extremity unbraced, even though it may be weak, is a distinct advantage in getting out of a chair. The unbraced extremity should be crossed over the braced one and the subject should turn toward the braced side.

Chair-Sitting-to-Standing Method No. 2. — This method is used by those with sufficient voluntary movement in the lower extremities to perform straightening of the hips and knees with the aid of crutches.

- (a) Grasp crutches by hand pieces.
- (b) Push down on crutches and raise body up to erect position.
- (c) Place crutches under arms and, if necessary, adjust hands so they can grasp crutches normally.

There are many ways of placing the hands on the crutches. The method allowing for the best purchase should be chosen. A variation of this method is to put both crutches in one hand and get up, using the support on one side only.

Sitting down on chairs presents different problems, since the subject must hold his balance while controlling the speed with which he yields to gravity.

Chair-Sitting Method No. 1. — This is for those with long double knee-locking braces on the lower extremities.

(a) Stand to one side of chair, as far toward front as possible, facing it and barely touching seat with knees.

(b) Holding onto chair back with one hand take crutches out from under arms one by one and place against chair so they will not fall.

(c) Unlock brace on side nearer chair back.

(d) Climb down back of chair until both hands are on side of seat opposite to one against which body is standing.

(e) Turn body toward front in direction of hands until it is seated, allowing knee to bend.

(f) Unlock other brace.

(g) Adjust body to good sitting position.

Chair-Sitting Method No. 2. — This method is used by those who have some control of hip and knee joints. Those wearing braces unlock them for this performance.

(a) With back to chair take crutches out from under arms and grasp hand-pieces.

(b) Let body down on chair seat gradually with most of weight on hands.

In this method, too, the hand pieces may be grasped in various manners. The one to choose is the one which will give the best support.

Chair-Sitting Method No. 2. — This method is used by those who have some control of subjects who wear two long knee-locked braces.

(a) Stand with back to chair far enough away to be assured of landing on chair.

(b) With locked knees fall onto chair seat by sharply bending forward at hips, raising crutches off floor or allowing them to remain inertly in contact with floor.

(c) Unlock both knees and adjust body to a good sitting position.

There should be room for the chair to slide backward to accommodate the weight of the subject and take care of the fact that he is seating himself without bending his knees.

The following step-by-step procedures for sitting down and getting up from a chair were developed by an unusually ingenious and energetic young man who had been severely disabled throughout his whole body, especially in his upper extremities, as a result of poliomyelitis. He had almost no abdominal muscles and both wrists were fused. He wore no braces and walked with difficulty with crutches. He could stand alone.

Special Chair-Sitting Method. —

(a) Having propped the crutches against the back of the chair, stand erect, back to seat of chair, hands at sides, feet about 12 to 15 inches apart.

(b) Bend trunk forward slightly, at same time bending right knee slightly, then left knee.

(c) Place hands gently on knees.

(d) Bend trunk forward so it is at right angles to rest of body.

(e) Fall gradually and easily onto seat of chair.

Special Chair-Sitting-to-Standing Method. —

(a) Place feet 12 to 15 inches apart.

(b) Bend trunk sharply forward, dipping downward.

(c) Place hands on knees and bounce on buttocks forward and upward off chair several times until weight is on feet, body remaining bent forward.

(d) Push right knee back against chair with right hand.

(e) Push left knee back with left hand.

(f) Lean trunk slightly to left.

(g) Straighten trunk, assuming an upright position.

It is important in teaching chair technics to realize the many dimensions and qualities of chairs. It is not sufficient to teach a disabled person how to use one particular chair. A collection should be made of chairs representative of those apt to be found often in daily life.

F. Ascending and Descending Ramps

Ascending and descending ramps are not among the most important daily activities, since ramps are not nearly so common as stairs and curbs.

However, since a ramp is nothing more than a slanting surface and ordinary pavements are often hilly, learning how to go up and down a ramp is important to walking out of doors and traveling. In addition, as an activity preliminary to stair climbing, ramp ascending is an excellent exercise, since it introduces the task of achieving height by the simplest means possible, a gradually inclining plane.

The methods are as follows:

Ramp Ascending and Descending Method No. 1. —

(a) Standing facing ramp, place both crutches separately or together on ramp.

(b) Move body forward by pushing on crutches and advancing.

In ascending by this method the subject has to be sure that his pelvis is always ahead of the rest of his body. Otherwise he may fall backward if his musculature is weak or absent.

Ramp Ascending and Descending Method No. 2. —

(a) Standing sideways with either right or left shoulder in direction of ramp, move crutches sideways either separately or together on ramp.

(b) Move body sideways onto ramp by pushing down on crutches and advancing it.

The inclination of the ramp, of course, makes a big difference. In teaching persons how to climb ramps, one should use a very slightly inclining surface at first and change this to ramps of greater inclination as the subject advances in ability.

G. Ascending and Descending Stairs

Walking up and down steps is a necessary daily activity because of the presence of steps in most buildings and the fact that elevators are not always available. Steps are also found at the entrance of many buildings.

Stairways differ greatly. Steps vary in height, depth and width. Some have overhanging lips. Others have no vertical boards between the steps. Stairways may have one or two banisters or none at all. Banisters vary in height. When there are two, the distance between them differs. If they are close enough the two may be grasped at once; otherwise only one can be used at a time.

The problem in stair climbing is to lift the body weight upward to a higher elevation while maintaining it erect. In the case of disabled persons who wear braces and use crutches or canes, stair-climbing presents many difficulties. It takes greater strength to raise the body to a higher elevation than it does to move it on a level surface. Braces, while serving for support, must restrict joint motion to do so. Therefore, bending at the hip, knee or ankle or any combination of these may be limited and thereby make stair climbing more difficult. Although crutches and canes may be greatly needed on a level surface, they may be much in the way while the subject is grasping banisters and climbing. Yet they must be taken along.

It is advisable to begin stair climbing by mounting very low steps. Special staircases for disabled persons have been used for this purpose. They often consist of a series of steps of different heights. A criticism is that these stair-climbing pieces of apparatus do not provide for a series of steps of a given height, so that if the subject can manage only a small step, once he has mounted it he must descend before stepping up again. It is preferable to have at least two sets of steps, one 4 inches high to represent the so-called public building steps and the other 6 inches high to represent standard indoor steps. They should have railings on both sides and the steps should be wide enough so that advanced subjects can practice mounting them without using the banisters. To one side of the central platform a bus step may be affixed. Such a piece of apparatus has been designed and built at the Occupational Therapy Workshop of the Connecticut Society for Crippled Children and Adults, Stamford, Conn.

Until ideally instructed staircases are available, planks of different thicknesses may be used to initiate the subject into the problems of step climbing. These may be placed one on the other and should be held stationary. An elevator may be used with success provided it can be spared. It can be raised as short a distance above the floor as desired and that height increased as the subject progresses.

The disability of the individual subject and the braces he must wear are the determining factors in the choice of methods of using crutches and canes for step climbing. Crutches tend to be needed more often in descending than in mounting steps, but in any case they must be carried along. If they are not used in mounting, they may be lifted up to the step after it has been completed, one at a time or both at once.

In teaching stair climbing it is best to have two therapists, one placed above the subject and the other below. The reason for this is that the subject may not know where he will need help. As he gets used to stairs he can be the judge of how much aid he requires and where the therapists should place themselves.

Before listing specific methods of stair climbing as performed by disabled people, we insert Miss Wilhelmine Wright's³ discussion of stair climbing, as it contains a number of valuable principles.

In climbing stairs the patient with no power in either leg must lift himself by the strength of his arms between the rail and one crutch, which is placed on the step above. The other crutch may be carried in the fingers that hold the supporting crutch, or two crutches may be used as one. In ascending the first steps the rail arm reaches far ahead and braces with the fingers on the outside of the rail and the elbows on the inside. As the top post is approached there is not room enough to reach ahead and the arm must be turned and held stiff and straight behind, so that the patient pushes himself up instead of pulling as he has been doing. Even a little power in the hips is of great assistance in getting the toes over the edge of the stair, where they are inclined to stick, but determined patients with strong arms can do it without any help from the leg muscles.

To come downstairs the patient, who is supported between one crutch and the rail, must first push the foot nearest the wall over the edge of the step. He then jumps down onto the next step with his one crutch and, turning his face toward the rail, pulls his other foot off the upper step onto the one on which he is standing. He is left as far as possible from the rail and must jump back beside it before he can descend another step.

If one leg is free from a brace, but weak, that is the leg which should be first thrown up onto the step above before the body and the other leg is lifted up onto it. In coming down, the unbraced leg should be left behind on the upper step until the braced foot and crutch have landed on the lower step. Any weight, however little, that can be borne on it will relieve the arms and assist the balance.

To go up and down stairs which have no rail without leg muscles is work for the intrepid mountaineer. Unless there is power to throw one foot up onto the stair above, the patient must go up backwards. He holds his crutches as straight and as near him as he can in order to get the maximum lift from them. As he raises his feet from the step and suspends himself on the crutches, he must endeavor to lift his hips up behind and fall forward on his face so that the weight of the head may balance the hips. It is the fear of leaning forward that prevents many patients from climbing stairs in this manner. After the feet are firmly placed on the step above, the crutches should be moved up one at a time.

To come down without a rail the patient may do as has been described for coming down with a rail, except that it is one crutch instead of the rail that he props himself on while moving the other crutch and corresponding foot. It is not until after the second foot has been pulled down that the second crutch should be brought down also.

The following methods are those actually used by disabled persons:

Stair-Ascending Method No. 1. — This method involves leaning on the crutch and raising the body to the step above. It is used by persons with long double knee-locked braces. If there is even a little power in front of the hip joint it is of great help in clearing the step. However, the method is used by some with severe spastic paraplegia from spinal cord injuries who have no muscle power below the waist. They clear the step by tremendous use of trunk and upper extremities or by swinging the pelvis and lower extremities strongly sideward for stair clearance. However, most severely disabled persons find it necessary to begin by advancing the crutch to the step above.

- (a) Stand facing staircase and near one of banisters.
- (b) Grasping banister with one hand, place the two crutches, to be used as one, under other arm, preparatory to transporting both crutches. Place crutches next to step to stabilize them. (Another way of carrying second crutch is to take it out from under arm nearer banister, placing hand under hand piece and grasping hand piece of other crutch, second crutch top remaining on outside and resting against upper arm.)
- (c) Adjust hand on banister so that forearm lies along it with elbow bent, leaning well forward. (It may not be necessary to bend elbow. In any case hand must be in advance of body.)
- (d) Lift body to next step by—
 - (1) pulling with hand on banister,
 - (2) pushing down on crutches and
 - (3) raising both lower extremities upward, bending at hips if possible.
- (e) Raise crutches to next step.

Stair-Descending Method No. 1. — This method involves moving the crutch to the step below before the body is lowered. It is used by subjects with long double knee-locked braces. If there is power at the hip joints and some strength in the trunk, the procedure is, of course, much easier. As in the case with the preceding method, most persons severely disabled from spinal cord injuries do not use the method but rather find it necessary to keep the crutches on the same step as the body in descending. However, this method is being used by some subjects with severe spastic paraplegia due to spinal cord injuries.

- (a) Grasp banister with hand nearer to it.
- (b) Place the two crutches, to be used as one, under other arm.
- (c) Adjust hand on banister so that forearm lies along it with elbow bent.
- (d) Place both crutches on step below.
- (e) Brace with hand and forearm on banister and push on crutches with other hand while lowering body onto step below.

Stair-Ascending Method No. 2. — This method is commonly used by those with spinal cord injuries in the dorsal and lumbar regions.

- (a) Grasp banister with hand nearer to it.
- (b) Place the two crutches, to be used as one, under other arm.
- (c) Adjust hand on banister so forearm lies along it with elbow bent.
- (d) Raise both crutches to step above.
- (e) Pull with hand on banister and push down on crutches, thus raising body up to next step.

A beautiful performance of stair climbing by a girl with a spinal cord injury in the lumbar region may be seen in the 16 mm., 400 foot sound film entitled, "Orthopedic Rehabilitation of Spinal Cord Injuries," now available for circulation or purchase from the Institute for the Crippled and Disabled, 400 First Avenue, New York 10, N. Y. This graceful girl swings her pelvis and lower extremities strongly sideward in order to clear the step, her skill being the result of many long hours of trial and error and almost a magical accomplishment in acrobatics.

Stair-Descending Method No. 2. — This method is commonly used by subjects with spinal cord injuries in the dorsal and lumbar regions.

- (a) Grasp banister with hand nearer to it.
- (b) Place the two crutches, to be used as one, under other arm.
- (c) Adjust hand on banister so forearm lies along it with elbow bent.
- (d) Without moving crutches, push on banister and lower body to step below.
- (e) Lower crutches to step below.

The foregoing methods of climbing stairs are used by persons who do not bend their knees. If the knees can be bent and controlled, climbing stairs is much easier, crutches or canes being used to support the extremities which need help.

In the case of artificial limbs, the problem of stair climbing is somewhat different. Since mounting steps is principally a knee activity, one or even two artificial limbs below the knees present no difficulty. One artificial limb above the knee requires placing first the complete genuine extremity on the step above, since there are knee muscles to straighten it out. The artificial limb must follow. Only one step at a time can be taken, because it is never possible to put a bent artificial limb on the step above and expect to straight-

en it out, since power to do so is lacking. In the case of two artificial limbs above the knee, one is kept locked and the other unlocked, as is common in walking, and the locked one is raised first to the step above by moving it sideward. When a subject has one artificial limb above and one below the knee, the extremity with the genuine knee joint is raised first, since that is the one that can be straightened out. Canes and crutches are usually placed on the step above.

The same principles with regard to the knee joint hold true for descending and for ascending stairs. Artificial limbs below the knee present no difficulties. One above the knee requires that it must go down first with the knee straight; one above and one below necessitate the above-the-knee artificial limb to be placed on the step first with the knee straight. Two artificial limbs above the knee require the locked one to be placed on the lower step first. Canes and crutches are usually placed on the lower step, in contrast to the situation in the case of spinal cord injuries, in which the subject usually keeps the crutches on the step above, because his balance is more precarious.

Further valuable instructions in step ascent and descent on artificial limbs have been given by Atha Thomas and Chester C. Haddan,⁴ as follows:

For one artificial limb above the knee:

It is always necessary, except in very rare instances, to go upstairs one step at a time, with the knee on the artificial leg fully extended so that it is securely locked. However, many reasonably agile amputees with above-knee prostheses can soon learn to go downstairs normally. The start is made with the artificial foot as far forward and as near the edge of the step as possible; then, with the shoulders well back, allow the body to go straight forward, making no attempt to flex the artificial knee, but allow it to remain straight until it bends of its own accord, when the good foot should be ready to come down on the next step. If, when coming forward, the body is not kept upright and the shoulders well back, the knee will not bend soon enough. As soon as the good foot is on the next step the artificial limb should be kicked forward, as in walking, and the heel placed on the next step, again as far forward as possible. A little practice will enable the amputee to place the heel in the correct position at every step.

When the artificial limb has passed the vertical and the knee flexes, the front portion of the foot naturally inclines downward; it is to allow this downward inclination of the foot to take place that the heel must be placed well forward on the step in such a position as to allow the instep of the shoe to roll over the edge of the step.

This exercise should be practiced on the bottom steps *only*, until the amputee has gained the necessary confidence to go forward on the fully extended artificial limb. With practice the amputee soon learns to come downstairs with an almost normal appearance. Walking down steep hills with the above-knee prosthesis is accomplished in a similar manner.

For two artificial limbs above the knee:

It must be remembered that one of the prostheses must be locked in full extension at all times; unless this is done the patient falls, and, unfortunately, few of those with double above-knee amputations can arise from the ground unassisted. Those who have stumps of sufficient length, with no flexion deformities, and who possess enough youth, vigor and determination, can usually master the use of two above-knee prostheses in a few weeks so that walking on level ground is fairly easy for them.

However, going up and down stairs is not so easy to master. To go upstairs, the amputee must place one of his prostheses upon the step above and possess sufficient strength in his stump to extend the knee of the prosthesis, thus raising the body upward to the step level. Few amputees possess enough stump strength to do this without hand rails or some other support. Going downstairs presents equally as serious a problem. Because the foot on the prosthesis must be held in a fixed plantar position, for reasons already explained, it is almost impossible to flex the knee of one of the prostheses while the other is in mid-air. Going downstairs with two above-knee prostheses is much more a matter of sheer courage than anything else. As a matter of fact, unless the amputee possesses an unusual amount of courage and determination he can never learn to go up and down steps on two above-knee prostheses and is not likely to use them on level ground with much success.

4. Thomas, Atha, and Chester C. Haddan: *Amputation Prosthesis*, Philadelphia, J. B. Lippincott Company, 1946, pp. 264-5.

We should like to relate the achievements of one young man injured at the age of 17, with resulting amputations above both knees and stumps $9\frac{1}{2}$ inches long. With his artificial limbs, he gets up from the floor unassisted except for his two canes. He ascends and descends chairs stiff-leggedly, that is, with one extremity locked at the knee and one unlocked but extended. He swings his locked extremity sideward to clear the step, then lifts his body upward. Next he raises the other unlocked but stiff extremity to the step already attained by the first extremity. Repeating this procedure, he goes up one step at a time, the locked extremity always leading. He goes down steps backward by first lowering his unlocked but extended extremity to the step below. Then he shifts his weight to that extremity and lowers the locked extremity to the step below that attained by the first extremity. He thus descends steps one after the other by swinging from side to side. He finds going down stairs frontward too dangerous.

Whenever possible he uses the banister on the side of the locked knee, because it is with the hand on the banister that he pulls and he therefore needs as much stability as possible. He holds one cane in the other hand, carrying the other in the fingers of the same hand but without using it.

We have seen children who, having suffered amputations above both knees, have grown up able to perform all the usual daily activities in a relatively speedy fashion and thus experience little or no disability.

Step climbing can be done sideward and backward, and these methods are permissible if no better ones can be found after experimentation.

If there are banisters available, climbing and descending stairs are more a problem in managing the body and braces than a crutch or cane problem, since the banisters are there for support. If there are no banisters, however, the crutches and canes may have to be relied on completely. In general, a crutch is lifted first to the step above and then a lower extremity on the side of the crutch which has been lifted is raised or swung up. The arm on the side of the crutch which has been lifted pushes down on the crutch and the whole body is raised upward to the step. Then the second crutch is raised.

Practice, experimentation and analysis will undoubtedly improve all these methods. Subjects need to practice first on one side of the staircase and then on the other both in mounting and in descending stairs, so that they become familiar with using both banisters.

Once standard steps have been mastered, bus, street car and train steps should be attempted. It is advisable to have apparatus especially built enough like such steps for subjects to practice these difficult feats before actually trying to board the vehicles.⁵

H. Ascending and Descending Curbs

Curb climbing, while more difficult than climbing stairs with banisters, is simpler than climbing stairs without banisters, since more space is available. There is no restriction sideward or frontward, so that crutches or canes may be placed at the most convenient distance from the body.

Since climbing a curb is so much more difficult than descending a curb, curb ascending and descending will be discussed separately.

Curb-Ascending Method No. 1. — This method of climbing a curb is used by persons who have a shoulder girdle and upper extremities sufficiently strong to raise and support the weight of the body, together with some voluntary movement of the lower extremities. If the knees bend this method is still easier, though it can be mastered by subjects with two braces locked at the knees. So far subjects with paraplegia due to spinal cord injuries who have no voluntary movement of the lower extremities have not been able to use this method.

5. Deaver and Brown,² pp. 12-14.

(a) Approach and face curb, stopping far enough away so as to be able to clear curb when lower extremities are raised to it.

(b) Push down on crutches, which remain in street, and swing both extremities up onto curb by bending at hips and/or knees when this is possible.

(c) Raise crutches to curb, the two at once or one at a time, as desired.

Climbing a curb by this method can be accomplished better if the subject approaches the curb with some speed and thus has gathered momentum for swinging up the curb.

Curb-Ascending Method No. 2. — If shoulder girdle or upper extremity weakness prevents use of Method No. 1, there is another method for subjects with long double lower extremity braces locked at both knees. Until recently, persons with paraplegia due to spinal cord injuries were not able to climb curbs, and this method was considered possible only for those with at least a small amount of voluntary movement of the lower extremities. However, one man with a spinal cord injury in the lumbar region and no voluntary movement of the lower extremities has mastered this method.

(a) Approach and face curb, stopping far enough away to permit one extremity to be swung up onto curb.

(b) Choose extremity which is easier to move and swing it backward and forward until you are able to place it on curb. Do this either by muscular power of lower extremities and/or with help of hands.

(c) Swing crutch on side of extremity which has been placed on curb across curb and body and place it back on street level but on far side of other crutch. This action turns subject a quarter of way around.

(d) Distribute weight between two crutches on street and extremity on curb, thus freeing extremity on street.

(e) Place that extremity on curb.

(f) Shift weight to one crutch, freeing other.

(g) Raise free crutch and place it on curb.

(h) Shift weight to crutch which is on curb, freeing crutch in street.

(i) Raise free crutch to curb.

The advantage of this method over the swinging-up method is that there are always three points of support while one crutch or one extremity is being moved.

Curb-Ascending Method No. 3. — The following method was initiated by the man with paraplegia due to a spinal cord injury as an improvement on Method No. 2, which he had mastered. He of course wears long double knee-locked braces. His achievement represents the first time a subject with a spinal cord injury in the lumbar region and no voluntary movement of the lower extremities has succeeded in ascending an 8 in. curb. He moves his lower extremities by means of trunk muscles.

(a) Stand with back to curb and far enough away from it so as to be able to swing one lower extremity back and up on curb.

(b) Choose extremity which is easier to move and swing it backward onto edge of curb, making sure foot is well on curb.

(c) Move crutches alternately backward with other extremity hanging until it is on curb.

(d) Continue to move crutches alternately backward while working feet back away from edge of curb, keeping them far apart.

(e) Turn sideways about 30 degrees in the direction in which you are going to walk away.

(f) Shift weight so as to free crutch on side toward which you have turned and place it on curb between and in front of feet, thus forming a tripod, making sure other crutch forms a good tripod down on street.

(g) Shift weight to crutch on curb and raise other crutch.

(h) Adjust weight evenly on crutches and feet.

Curb-Ascending Method No. 4. — This method is used by those with some power in the trunk and lower extremities. Knees may be locked or not.

(a) Right crutch up on curb.

(b) Right foot up.

(c) Shift weight to both crutches and foot already on curb and thus raise whole body and other foot on curb.

(d) Shift weight to crutch and two feet on curb, thus freeing other crutch.

(e) Place free crutch on curb.

Descending a curb does not present the difficult problems that ascending it does. All disabled persons who can progress forward on a level surface can come down from a curb provided fear can be overcome.

Curb-Descending Method No. 1. —

(a) Standing at edge of curb, lift both crutches and place them in street.

- (b) Lower body to street by pushing on crutches and by simultaneously either —
 - (1) bending at hips to clear curb and swinging both feet to street, or
 - (2) taking one foot off at a time.

Curb-Descending Method No. 2. — A severely disabled person with no control at hip joints and no voluntary movement of the lower extremities must have an easier way of getting off a curb.

(a) Standing near edge of curb with crutches at very edge, lift both crutches and drop in street very near curb, being sure to bend forward at hips. (Bending at the hips puts the weight of the body mainly on the lower extremities, so that the amount of weight resting on the crutches is very small, thus minimizing the shock or jolt of lowering the weight.)

(b) Take small alternate steps with crutches away from curb until body becomes elongated.

(c) Jerk feet toward edge of curb preparatory to descent.

(d) Drag one foot at a time off curb as crutches are alternately advanced to maintain balance.

Curb-Descending Method No. 3. — A common method used by those with fair balance but insufficient power in the upper extremities to use the preceding method is as follows:

(a) Left crutch down to street.

(b) Right crutch down.

(c) Lower body.

I. Getting Down and Up From Floor

Getting down on the floor is a necessary daily activity because objects often have to be picked up from the floor, sometimes from under furniture. Getting up from the floor is a necessary daily activity as a preparation for walking. It becomes an acute need in case of a fall, particularly in the middle of the street.

A distinction needs to be made between sitting down on the floor and falling down on the floor. The subject of falling will be taken up later. Getting down on the floor without the help of any furniture or person but only with the subject's own appliances may present difficulties.

Methods for getting down on the floor are as follows:

Floor-Standing-to-Sitting Method No. 1. — Subjects with two crutches and two long braces locked at the knee use this method.

(a) With braces locked, move crutches alternately a tiny step at a time forward and out to side (diagonally) in such a way that trunk is gradually lowered forward.

(b) When as near to floor as possible, throw crutches aside and drop to floor on hands, distributing weight at wrist, elbow and shoulder joints.

This method may also be used when there are no braces and the knees can bend and the difficulty is with spasticity and involuntary movement of the lower extremities.

Floor-Standing-to-Sitting Method No. 2. — Those with long double knee-locked braces have gotten down to the floor in the following manner. Of course, it is easier to do this if the knees can be bent and controlled.

(a) Place hands on cross pieces of crutches and, using the crutches as canes, take small alternate steps with them forward and out to side in such a way that trunk is bent forward at the hip joints and gradually lowered forward.

(b) When body is near floor, throw crutches aside and drop to floor on hands, distributing weight between wrist, elbow and shoulder joints.

Floor-Standing-to-Sitting Method No. 3. — An expert and graceful man disabled by poliomyelitis at the age of a few months wears long double leg braces and uses two crutches. The following steps are those he uses for getting down and up from the floor with only his crutches to help him. He keeps his braces locked at both knees.

(a) Keep right crutch under arm as hand is turned on hand piece so palm faces out.

(b) Turn hand so crutch comes out from underneath arm.

(c) Advance crutch in front, forming a straight line with extended upper extremity.

(d) Drop left crutch.

(e) Fall on left hand.

(f) Drop right crutch.

(g) Place right hand on floor.

(h) Turn body to sitting position.

Getting up from the floor is one of the hardest daily activities to achieve. Only one method is given here, since all others so far accumulated are too complicated and individual to lend themselves to simple analysis.

Floor-Sitting-to-Standing Method. — The man who uses the preceding method of getting down on the floor follows this step-by-step method of getting up from the floor. His weakness is distributed unevenly throughout the body. The right upper extremity is the stronger and hence the more useful. Basically the method is sound, although many variations of crutch and upper extremity use are to be expected according to the distribution of the weakness of the disability.

(a) Sitting with lower extremities extended and braces locked at knees, place one crutch on floor on each side of body, with tops toward your head.

(b) Place both hands on floor to right side of body, and push on them to raise body, at the same time turning it so as to be facing floor.

(c) Move hands alternately toward body, pushing hips backward and upward.

(d) Shift weight onto left hand with elbow held stiffly.

(e) With right hand grasp hand piece of crutch nearer to it, turning crutch so hand and arm are on inside.

(f) Place right crutch in front and to side of body (diagonally away from body in front) with right upper extremity steadied against uprights.

(g) Shift weight to right crutch.

(h) Grasp left crutch with left hand, turning it so hand and arm are on inside, and place it on floor with no weight on it.

(i) Raise body by leaning and pushing on right crutch.

(j) Place left crutch under left arm.

(k) Place right crutch under right arm.

In teaching a subject to get down on the floor and arise therefrom, it is a good idea to have him use chairs and footstools for support and gradually learn to manage with fewer and fewer of them. Stall bars and parallel bars may also serve for support in the beginning.

J. Falling Technics

We are all born with the fear of falling. We really do not ever get over it. From birth we struggle to keep our balance. When we fall as children a great fuss is made about it, and as old people we mortally dread broken "hips." The emotional shock from falls is often greater than the physical harm, and this is because of the great fear we all harbor of losing our balance and falling against a hard or otherwise dangerous surface and bruising ourselves or breaking our bones. If, with normal faculties, we have these fears, then how much greater they must be in the case of disabled persons, who have much less equipment than we have with which to keep their equilibrium!

Athletes, dancers and acrobats are taught how to fall. Soldiers and sailors must know how to fall. During the war the commandos and parachutists spent many hours studying the best methods of falling. Yet they have all their motor faculties. Surely disabled persons learning to walk and travel should have early instruction in how to fall. This instruction can be started even before braces and crutches are used.

The first procedure is to produce a large soft mat, the consistency of a thick mattress. In fact, a large mattress may be used in the case of a subject who is not too big. The subject should be allowed to roll around on the mattress and no matter how disabled he is should be encouraged to do as many exercises as he can in order to learn to manipulate himself to the best of his ability. Agility in any and all positions is conducive to better management of the body in walking. Therefore mat exercises and stunts of all varieties should be used regularly with perfection an aim.

Before attempting any falling exercises from the standing position, the subject should try falling from a sitting position. The subject sits with lower extremities extended in front of him. He tips his trunk first to one side and then to the other and lands either on one hand or on two. The elbows should be bent when receiving the weight and each joint—wrist, elbow and shoulder—should give and take part of the weight as the body falls on them.

The subject should also practice falling backward from a sitting position. The trick here is to get the hands down on the mat before the body lands. The fingers should point forward so that the elbows can bend, and in this exercise, too, the shoulder, elbow and wrist joints should share in catching the weight of the body as it tips backward. If the fingers point backward the elbow cannot bend and a fracture is more apt to occur, because the shock is not distributed between the joints.

The next step in learning to fall is losing the balance from a kneeling position. The rules are the same as those for falling from a sitting position. The subject may attempt to fall forward, in which case he bends at the hips and lands on his hands, with shoulder, elbow and wrist joints all giving as the forward fall of the body is broken.

In preparing to fall forward from a standing position, the subject should arrange himself in a prone position on the mat or mattress. His upper extremities, head, neck and trunk should be raised off the mat and held by technicians. It should be explained to him that he is to be dropped, and that he is to be prepared to take his weight partly at the wrist joints, partly at the elbow joints and partly at the shoulder joints. This means that the upper extremities are to be out at the sides and bent when he lands on the mat, and that all three joints give, that is to say, are flexible, and also receive the weight proportionately. He is raised only a few inches at first, then this height is increased until he can be dropped from an almost vertical position.

When this degree has been attained, then the next step is to have him fall of his own accord from a standing position. The final test for falling forward would be to have some one push him forward when he was unprepared for the push and have him successfully break his fall.

With further regard to falling forward from a vertical standing position, the subject should bend slightly at the hips if he can and land in a slightly bent position, taking his weight partly on shoulder, elbow and wrist joints and letting the hips come down last. This is easier than tipping forward and landing with the body in straight alinement from top to bottom. The latter technic may be tried as an advanced exercise, however, since the more stunts achieved, the greater the ability to maneuver the body under all circumstances.

A caution, however, is necessary with regard to teaching falling to persons with no muscular power with which to control the pelvis and lower extremities. Since there is no way of easing the fall of the lower part of the body, there is danger of dislocating joints by the unbroken shock of contact with the floor. Soft mats or pillows placed in such a way as to protect these parts are recommended for falling practice.

The subject of falling backward is complex. It is unnatural to lose one's balance backward without attempting to catch one's self and in some way twist the body so as to fall forward. In fact, reflexes cause us when in danger to use all the flexor muscles to draw our extremities forward and toward the body so as to protect the front part of the body. Nevertheless, backward falls do occur when a person loses his balance so suddenly and unexpectedly that his reflexes have no time to come into action.

Wrestlers, acrobats and athletes learn to fall backward by bending sharply at the hip joints with straight knees, throwing trunk and upper extremities forward, so that they land first on the upper parts of the thighs, then rock back on the pelvis and finally do a backward roll with the remaining momentum. A series of backward falls may be planned with the subject falling first into a soft chair, then onto a pile of cushions or rolled up mats and finally on a

flat mat. It may be repeated here that in a backward fall the fingers should always point forward, so that the elbows may bend and the chances of fractures and dislocations be lessened if the fall is broken by the hand.

For disabled persons these methods are strongly contraindicated because of the danger of fractures from jarring of the entire spinal column and skull on contact with the ground. Voluntary falling backward must remain for those who not only have average power and coordination but indeed excel in athletic ability. Disabled persons need to be taught to twist their bodies so as to fall with their arms in front of the body and facing the ground.

There are no established methods of falling sideward, as disabled subjects do not fall sideward in a characteristic way. When they fall sideways they usually twist on their crutches and go down facing forward.

It has been reported by disabled subjects that, contrary to usual beliefs, crutches do not constitute a serious difficulty during falling. The crutches slide easily out of the way and are not often hazards.

The subject should practice falling sideways from a standing position on a mat by twisting first to one side and then to the other in order to fall facing forward. The routine and precautions suggested for falling forward should be followed.

There is no guarantee that these suggested methods of falling will be used in a real falling situation. The same objection might also be made to the teaching of falling technics to so-called normal subjects. However, this is the best that can be done, and surely some experience will reduce fear. Certainly the more experience there has been with these falling technics the greater the chance that they will be used in an actual falling situation.

K. Obstacle Clearing

In the normal course of average daily life, many objects get in our way, and we have to go around them, step across them or withdraw from them. Object clearing becomes a constant source of fear and displeasure to the severely disabled person unless he has been trained to handle himself in such situations.

Common objects should be placed in the path of the disabled person until he learns to tackle any difficult situation. A good first step is to practice getting over an ordinary door sill. The edge of a rug is even harder, because it is not stationary. The subject should try clearing small boxes or similar objects. Sandbags are good to practice stepping over. The most common objects to be cleared are electrical extension cords. Ropes may be substituted if cords are not available.

The requirement, of course, is ability to raise the body to clear the obstacle. This is difficult with knee-locked braces, but it can be done with practice.

L. Picking Up Objects

Picking things up from tables or from the floor should be practiced by any one who has mastered the use of crutches and has a chance of coming to an erect position again. In order to pick things off the floor one must be able to reach over to the floor and arise from that position.

M. Carrying Objects

Carrying objects should also be practiced. Packages may be placed between the fork of the crutches. A neater way is to have hooks on the crutches at about the level of the handpieces, on which bags or brief cases may be hung.

Comment

The mastery of daily activities on crutches is not complete until the activities can all be performed under many different circumstances. The activities should be learned first in the easiest possible environment, for instance on a rough floor with apparatus and furniture that are stable. Then the same activities should be learned on waxed floors, provided all appliances have been adjusted and the crutches supplied with proper suction tips. As the crutch tips tend to collect wax, they must be scrubbed daily with a brush and plain water. The last stage of daily activity training should take place outside, on pavements and streets, amid traffic and people, with the red and green lights going off and on and the crowds milling about.

A disabled person is not completely on his own until he can cross a busy main street at noon on a working day. In fact, some accomplished and zestful disabled persons of our acquaintance have been seen in Times Square on New Year's Eve.

EDITOR'S NOTE: Subsequent articles in this series will also appear in the ARCHIVES.

TWENTY-EIGHTH ANNUAL HOSPITAL STANDARDIZATION REPORT *

**Including List of Approved Hospitals in the United States, Canada,
and Other Countries as of December 31, 1945
The 1945 Survey and Its Background**

Victory and peace happily color the outlook for hospitals as the twenty-eighth annual Hospital Standardization report is being prepared. It was under just such circumstances that the early work of promoting this great effort to improve hospitals was done. The difficulties experienced during World War I directed attention to the lack of uniformity in hospital practices. Since that time unparalleled progress has been made through the Hospital Standardization program of the American College of Surgeons and now at the close of World War II even greater advances in the hospital care of the sick and injured are to be expected.

At this time of reformulating plans for progress in an era of peace it is desirable to analyze the hospital, department by department, to determine the status of each service, and the prospects for elevating the standards for the good of the patient. Following the presentation of statistics and a brief summary of Hospital Standardization in general there are given in this report comments on the various factors and services which enter into the functioning of the hospital and affect post-war planning.

Physical Medicine

What constitutes a real revolution has occurred in theories of convalescent care, and the departments which are chiefly affected are those of physical and occupational therapy, which now tend to be combined under the classification of "Physical Medicine." Modern physical therapy service in hospitals was born in World War I, and it has risen to sudden maturity in

* Reprinted in part with permission, Bull. Am. Coll. Surg. 30:281 (Dec.) 1945.

World War II and in the post war period. The old dependence upon rest is giving way to the encouragement of constructive mental and physical activities with rest as a secondary factor. The convalescent reconditioning program in Army and Navy hospitals is pointing the way to the needs for a similar program in civilian hospitals.

In an article in the September issue of the *Modern Hospital*, Major Henry B. Gwynn of the Reconditioning Consultants' Division of the Office of the Surgeon General of the Army, declared that physical reconditioning in civilian hospitals must consist largely of general calisthenics of a type that will exercise all important body muscle groups. Such exercises promote muscle strength, increase metabolism, and improve circulation throughout the body. The Army has developed sets of exercises which safely permit exercising by bed patients and by ambulant patients. In order for the exercises to be properly conducted, specially trained nurses or physical therapy technicians should supervise the activities. Orthopedic and neurosurgical cases in particular require specialized forms of exercise. The physical therapy department should have a remedial gymnasium equipped with medicine balls, skipping ropes, weights, pulleys, shoulder wheel, horizontal ladders, rowing machines, Indian clubs, and stall bars; but individual prescriptions and scheduling should govern treatments. The modern hospital has a physical therapy department which provides various types of physical treatments such as massage, hydrotherapy, electrotherapy, heliotherapy, and mechanotherapy.

Occupational therapy, long considered to be mainly applicable to mental patients, is now being extended to practically all patients in progressive hospitals. For the average medical and surgical patient it may consist chiefly of bibliotherapy, but for all patients whose stay in the hospital is extended beyond ten days or two weeks the therapeutic value of woodworking, small metal work, ceramics, leather work, weaving, plastics, and graphic arts is beginning to be appreciated.

Another development is the reproduction in departments of physical medicine of devices which approximate conditions which the patient will be obliged to face when he leaves the hospital. Examples are street car steps, traffic signals, revolving doors and the like. The remodeled department at St. Luke's Hospital, Chicago, even has a gravel pit in which patients may use a shovel. Again in this department it must be emphasized that competent medical supervision and well trained technicians are imperative. The department should be well organized. In the *Manual of Hospital Standardization* will be found Minimum Standards for Departments of Physical and Occupational Therapy with explanations of the principles.



MALPRACTICE: SIMULTANEOUS APPLICATION OF TIGHT BANDAGING AND HEAT TO ARTHRITIC FOOT *

Mrs. Treptau was suffering from what she thought was a sprain of her right foot and on Aug. 27, 1941 she went for treatment to the Behrens Spa, Inc., a hospital incorporated under the laws of Wisconsin and having as full time employees several chiropractors and at least one doctor of medicine. She was examined by Dixon, a chiropractor employed by the Spa, who advised her that she needed "vertebra adjustments," several of which were given to her by Dixon and by Behrens, another chiropractor, until September 14. In the course of those so-called treatments the swelling and pain in the foot increased greatly. September 14, a roentgenogram was taken under Behrens' direction at the Spa, and "by palpation in combination with the x-ray he determined that she was suffering from arthritis." He then applied a circular bandage consisting of two pieces of tape about 18 inches long and 1½ inches wide, starting one piece of tape about the top of the instep and going around the instep twice, and the other piece of tape went the other way. While applying the tape he told his patient that she had a bone infection and to grind her teeth as he tied the bandaging "real tight." This caused the patient a great deal of pain. Behrens then ordered "diathermo heat treatments" applied immediately. Two such treatments were given on each of the two following days. After the first heat treatment the patient was put in bed at the Spa. On her repeated complaints that the bandaging was too tight and that the pain was too great, a physician employee at the Spa apparently loosened the tape somewhat at the top of the foot but not around it. When the subsequent heat treatments were given the circular bandage was still in place and unloosened around the foot. The patient complained continually of great pain and the foot began to swell. On the 16th, the foot became black and blue, was very painful, and was so swollen that it covered the upper part of the adhesive tape bandage. On the failure of nurses attending her to bring a "doctor" to alleviate her pain, she induced the nurses to take the tape off her foot. The next day she returned to her home and called Dr. Wheelihan, a physician, in on the case. Dr. Wheelihan testified that when he first examined the patient he found the foot extremely swollen and very tender to touch, that this condition indicated a markedly impaired circulation, one of threatened gangrene which was the result of the impaired circulation. Just what the subsequent history of the case was the reported decision does not make clear except that at the time of the trial there was a loss of flexion and limitation in the foot, apparently a permanent condition.

The patient and her husband subsequently sued the defendant corporation, which operated the so-called Spa, for damages sustained by the patient as the result of alleged malpractice in the treatment rendered by the chiropractors employed by the Spa. On behalf of the plaintiffs three practicing physicians were called as witnesses, Dr. Wheelihan, who attended her after she left the Spa, and Drs. Werra and Nicely. Dr. Wheelihan testified that the probable and direct cause of the impaired circulation and the condition that he found when he first examined the patient was the constricting tape applied by chiropractor Behrens and the diathermic treatments ordered by Behrens while the tape was in place; that the treatment given was not in accord with the recognized proper practice of the community; that the combination of constricting bandage plus diathermy was not proper in any school

* Reprinted with permission, J. A. M. A. 129:1287 (Dec. 29) 1946.

or field of medicine; that a bandage constricts the circulation and heat tends to increase the circulation; that one or the other would have been proper, but not the combination; and that in his opinion such treatment and accentuation of the arthritic condition of the foot probably resulted in the present condition of the foot. The testimony of Drs. Werra and Nicely was to the same effect. The jury, in a special verdict, found that by the simultaneous bandaging and application of diathermic treatments the defendant failed to exercise the skill and care required by law and that failure was the cause of the disability suffered by the patient after treatment. The court accordingly entered judgment for the plaintiffs, and the defendant appealed to the Supreme Court of Wisconsin.

The defendant contended first that the trial court disregarded the well established principle of law that a physician is not liable for malpractice if he selects and uses one approved method of treatment although there may be testimony that if other expert witnesses had been treating the case they would have used another method or that the method employed was improper and that since there was testimony that the method employed by Behrens was a method of treatment recognized by the medical profession in that vicinity the defendant cannot be held guilty of malpractice. The trial court, however, said the court, consistently considered applicable the rule of law contended for by the defendant, as is exemplified in the following instruction it gave to the jury:

You are further instructed that if you find from all the credible evidence in the case that the school of medicine recognizes more than one method of diagnosis or treatment of the condition which affected the plaintiff's right foot, it [defendant] was not required, at its peril, to select one or the other of such methods and was at liberty to select either of said methods and may not be considered wanting in the required degree of care and skill merely because expert witnesses give their opinion that some other method would have been preferable.

Consequently, the defendant's contention in this respect cannot be sustained.

The defendant next contended that a verdict in a malpractice case must be based on expert testimony that there was malpractice present and that the malpractice proximately caused the condition complained of. That rule of law, answered the court, is correct but again it is evident from the record that the trial court rightly concluded and duly instructed the jury that the plaintiffs must prove to a reasonable certainty by expert testimony that there was malpractice present and that such malpractice proximately caused damages as the jury assessed. The jury was free to accept in determining those issues either the expert testimony offered by the physicians who testified for the plaintiff or the testimony of the chiropractors in the defendant's employ.

The defendant contended further that there was no credible evidence adduced at the trial to sustain to a reasonable certainty the jury's finding that the use of the treatments in combination by Behrens was the cause of the increased ailments, disabilities and suffering, or that such increase, if any, was a natural and probable result of such use of treatments by Behrens. The defendant claimed that there was testimony that the patient's ailments, disabilities and pain could have been caused by the arthritic condition which affected her foot and that the burden of proof resting on the plaintiff is not met by showing that the ultimate condition might also have been caused by Behrens' unskilful treatment; that there was no testimony that the bandages were applied in such a manner as to impair circulation of the foot; that the claim that a tight bandage would aggravate an arthritic condition has no basis on medical fact; and that in the absence of gangrene no injury could result from the application of a tight bandage. This argument of the

defendant, said the court, cannot be sustained. The jury's findings as to the defendant's malpractice and that it caused increased ailments, disabilities and suffering and damages is warranted by the testimony of the three physicians called by the plaintiffs.

The defendant next contended that medical practitioners such as were the three physicians called by the plaintiffs are not competent to testify as to the degree of care and skill required to be used by a chiropractor in treating a patient, relying on *Nelson v. Dahl*, 174 Minn. 574, 219 N. W. 941, reading in part as follows:

When a patient selects one of the several recognized schools of treatment, he thereby adopts and accepts the kind of treatment common to that school; and the care, skill, and diligence with which he is treated, when that becomes a question in the courts of this state, must be tested by the evidence of those who are trained and skilled in that particular school of treatment.

The rule contended for, said the Supreme Court, is not applicable in view of the real issue in this case. Plaintiffs do not claim that there was malpractice on the part of the defendant while Behrens was engaged in the practice of chiropractic by chiropractic manipulations or adjustments of the spine. Instead, plaintiffs contend there was malpractice when he and his associates went beyond the practice of chiropractic and entered into the general field of the practice of medicine, by the application of the bandage to the foot and by giving in conjunction therewith the diathermo heat treatments, neither of which was the practice of chiropractic by chiropractic manipulation or adjustment of the spine. On the contrary, the application of the bandages and the heat treatments given in this case are part of the general practice of schools of medicine, and, in so far as there was thus an invasion of the general field of that practice, the methods thus used by defendant's employees in diagnosis and treatment were subject to the rules applicable in the practice of medicine and surgery. Consequently there was applicable in this case the rule that the considered opinion of a qualified member of the profession of medicine and surgery is competent and proper as to whether or not the treatment given constituted the required degree of care and skill which physicians in good standing in the community usually exercise. When there is such an invasion of the field of medicine by the treatment given, the rule, which confines the inquiry as to the required degree of a practitioner's skill and care to the rules and principles of chiropractic or the particular school of science or medicine to which he belongs, does not exclude the testimony of physicians of the other schools when that testimony bears on a point in relation to diagnosis or treatment as to which the principles of the schools do so should concur. When a chiropractor assumes to diagnose and to treat disease he must exercise the care and skill in so doing that is usually exercised by a recognized school of the medical profession. *Kuechler v. Volgmann*, 180 Wis. 238, 192 N. W. 1015.

The court also did not agree with a contention of the defendant that because it was a hospital and could not lawfully engage in the practice of medicine it could not be held liable for damages caused by malpractice in the performance of professional acts of its staff. In arriving at this conclusion the court quoted from 26 Am. Jur. p. 597, reading as follows:

A hospital conducted for private gain is liable to its patient for injuries sustained by him in consequence of the incompetency or negligence of a physician treating him at its instance, under a contract binding it to furnish him proper treatment. A physician so employed is not an independent contractor.

The judgment in favor of the patient and her husband was accordingly affirmed.—*Treptau v. Behrens Spa, Inc.*, 20 N. W. (2d) 108 (Wis., 1945).

CERVICAL PERIARTHRITIS *

Diagnosis and Treatment

W. J. ZEITER, M.D.

and

F. B. HOUSE, M.D.†

CLEVELAND, OHIO

The term, periarthrititis, by definition means inflammation in the tissues around a joint. Every case of arthritis has an associated periarthrititis. The term, cervical periarthrititis, we have reserved for those cases in which no arthritis or other abnormal anatomical bone change can be demonstrated. It may be the cause of pain and stiffness in the neck and is usually recognized by the presence of soreness in the supporting ligaments and muscles of the neck.

Many patients with cervical periarthrititis complain of numbness and aching in the arms and hands and may have soreness of the shoulder muscles. In the absence of x-ray evidence of disease of the bone, the finding of muscle tenderness and painful limited motion in the neck usually identifies the neck as the cause of trouble.

Cervical periarthrititis may be associated with functional conditions of the spine, such as scoliosis and relaxed posture. It may be part of the generalized rheumatic involvement of periarticular structures commonly called chronic fibrositis. In some cases, exposure to cold and febrile diseases such as influenza may be important etiologic factors.

The conditions which are considered in the differential diagnosis of cervical periarthrititis are osteoarthritis of the cervical spine which is shown on x-ray, and subdeltoid bursitis demonstrable on physical examination or x-ray. Less commonly, one has to differentiate rheumatoid arthritis in the cervical spine, ruptured intervertebral disc,¹ hypertension, scalenus anticus syndrome,² cervical rib,³ and rarely, neoplasm either in the cord or with metastasis in bone.

Treatment

Treatment of cervical periarthrititis is directed to relaxation of the neck muscles, breaking up of fibrositic nodules when present, stretching of the fascial tissues, and increasing the width of the vertebral foramina. In our experience we have found the combined use of local heat (usually short wave diathermy), massage, stretching, and progressive exercises effective in relieving the patient. These treatments are given two or three times a week and may be supplemented with home treatments. The total number depends on the patient's response.

The patient, stripped to the waist, rests comfortably on a padded table. Short wave diathermy is applied to the neck, including the upper fibers of the trapezius muscles, for 20 to 30 minutes. At times it is necessary to lower the intensity of the diathermy since some patients have increased muscle pain when treatment is started. If the patient does not tolerate short wave diathermy, infra-red may be substituted.

Heating is followed by massage in the direction of the venous flow. Massage is light at first, increasing in depth depending upon the acuteness

* Reprinted with permission Cleveland Clin. Quart. 13:18 (Jan.) 1946.

† Assistant in Medicine.

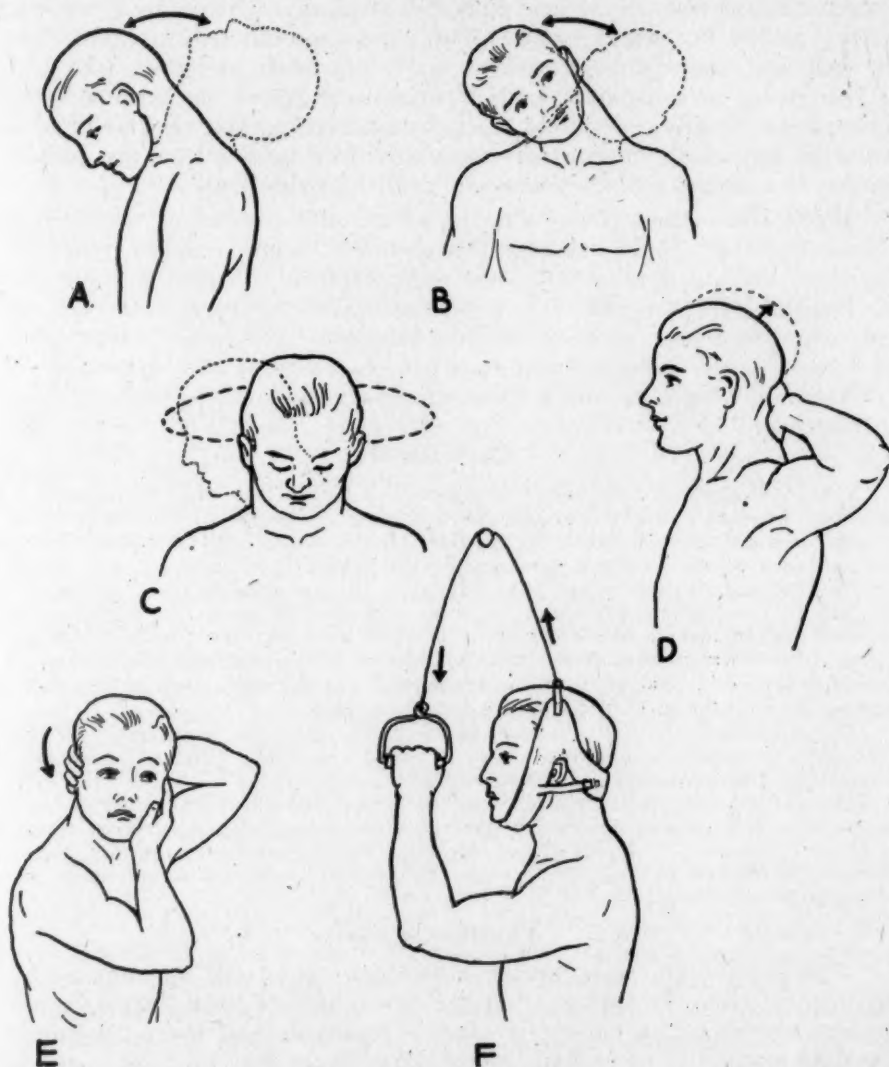
1. Spurling, R. G., and Scoville, W. B.: Lateral Rupture of Cervical Intervertebral Discs; Common Cause of Shoulder and Arm Pain, Surg., Gynec. & Obst. 78:350 (April) 1944.

2. Nachlas, I. W.: Scalenus Anticus Syndrome or Cervical Foraminal Compression, South. M. J. 35:663 (July) 1942.

3. Nachlas, I. W.: Brachialgia, Manifestation of Various Lesions, J. Bone & Joint Surg. 26:177 (Jan.) 1944.

of the symptoms and the patient's tolerance. Vigorous massage is contraindicated as it may increase the symptoms. The massage, however, should be deep enough so that after a varying number of treatments fibrositic nodules may be broken up. It is necessary that the therapist allows the feel of the tissue to guide him in the depth of massage.⁴

The patient then sits in a stable chair. My means of the active exercises illustrated in A, B, and C the range of motion is determined. The therapist



then manually stretches the neck and assists the patient in increasing his range of motion. The amount of assistance that can be given will be determined by experience. Care should be taken not to attempt to progress too rapidly in the exercises at this point. Finally, the patient moves his head against the resistance of the therapist's hand.

Stretching and assistive exercises are repeated with the aid of a head sling such as the Sayre type. The patient raises the buttocks about one inch from the chair, the sling is made taut by means of a windlass and ratchet, and he then allows his weight to fall against the resistance of the sling. This stretching is usually not difficult and most of the weight is carried by the

4. Krusen, Frank H.: *Physical Medicine*, Philadelphia, W. B. Saunders Company, 1942.

chair and only part by the sling. Assistive exercises are again repeated. The patient then stands and rises on his toes while the sling is made taut. The weight is thus divided between the heels and the sling when his feet resume the anatomical position. Assistive exercises are repeated. Stretching by means of the sling is repeated two to three times in each position.

Local heat and exercises are essentials of home treatment. The patients should be instructed in the use of a firm bed for sleeping and postural correction. Satisfactory local heat may be obtained at home from an electric heating pad or hot water bottle. The patient should be taught to exercise his neck first actively as illustrated in A, B, and C, and then with the assistance of his own hands attempt to increase range of motion where limitation exists. Finally, he should learn to exercise against resistance as illustrated in D and E. Frequently it is advisable to instruct the patient in the use of a sling for home treatment as in F of the figure.

When the patient is not able to have a full course of treatment by a trained therapist, home treatment may bring about complete relief. Furthermore, these patients are subject to recurrence of symptoms and if they are familiar with the use of heat and exercises they may find early relief. Treatment, of course, is most effective in the early stages, since it prevents the fascial tissue stiffness encountered in the cases of long duration.

The following case is illustrated of cervical periarthrititis and its response to treatment.

Case Report

A woman, aged 32, complained of episodes of pain in the back of the neck. This pain was frequently worse with fatigue and was associated with radiation into the occipital area and down between the shoulder blades. On several occasions, the patient had noticed a poorly localized numbness in the hands.

Physical examination revealed the patient to be of normal habitus. Blood pressure was 110/75 mm.Hg and heart and lungs were normal to percussion and auscultation. Skeletal examination revealed a relaxed posture with increased lumbar and cervical curves. There was moderate restriction of rotation of the neck and pain on passive extension of the neck. Palpation of the deep muscles of the neck revealed tenderness extending down to the level of the fourth dorsal vertebra.

The laboratory reported a normal blood count, and x-ray examination of the cervical spine revealed no abnormal bone or joint changes. Clinical impression was cervical periarthrititis associated with postural strain.

The patient was started on physical therapy as described. She was given treatments twice a week supplemented by daily postural exercises and exercises to the cervical spine at home. The patient noticed immediate improvement, and after four treatments her symptoms entirely disappeared. Follow-up observation in four weeks revealed no return of symptoms.

Physiologic Basis

The physiologic basis for this treatment is not well documented by experimental data. It appears that the first effect of local heating is on the sensory nerves. The patient is more comfortable and there appears to be a certain amount of neurogenic relaxation. There may be a reflex relaxation of the muscles supplied by the same segment supplying the skin area which is heated. Through sympathetic nerve stimulation there is a general vasodilatation as shown by increased skin temperatures at distant parts. Locally, the capillary dilatation is more marked, apparently because of the direct effect of increased temperature on the capillary walls.

The effect of heat on the muscles is primarily through the increased circulation.⁵ It has been shown that the flow in a limb exposed to temperature of 42 C. is on the average five times as great as when exposed to temperatures of 26 C.⁶ On the other hand the external application of heat

5. Coulter, J. S.: *Physical Therapy: Heat and Cold*, M. Physics, p. 1043, 1944.

6. Drury, A. N., and Jones, N. W.: Observation Upon Rate at Which Oedema Forms When Veins of Human Limb Are Congested, *Heart* 14:55 (April) 1927.

simulates a depression in the general metabolism.⁷ It is true that raising the temperature of the tissues will increase the local metabolic rate. The total change in temperature of the muscular tissues after diathermy, however, has been shown to vary from 2 to 4 C.⁸ In a living externalized heart of a cold-blooded animal a rise in temperature of 10 C. results in an increase in metabolism of two to three times.

It can be seen, therefore, that the increase in circulation is far in excess of the small increase in metabolism that may occur, and metabolites can be literally washed out with reduction in the irritability of the muscle.

Light massage in direction of the venous flow increases the local circulation still further, and the effect of light stroking on the nerve endings enhances the neurogenic relaxation.

Deep massage, as described, softens the stiffened fascial tissue and breaks up fibrositic nodules if present. Stretching widens the intervertebral foramina with relief of paresthesias due to inflammation or possible pressure on nerve roots. Frequently, immediate relief of numbness and tingling in the hands, when present, follows the first manual stretching of the neck.

Exercises reestablish normal joint motion. Muscles made weak by inflammatory processes and disuse are strengthened by active motion and by working against resistance.

Although physical therapy is of first importance, attention should be given to elimination of causative factors and treatments of the generalized disease when present. Frequently, diet therapy and general regulation of the patient's activities is important. Fatigue states must be eliminated. Extremely important are the correction of faulty body mechanics and posture. Exercises for posture training should be a part of every physical therapy program for patients with cervical periarthritis.

Eye strain which may be associated with cervical periarthritis is the type due to extra ocular muscle imbalance. Neck muscles have been thought of as accessory eye muscles. In cases of weakness in some of the intra-orbital extra ocular muscles, compensatory stresses may be placed on the posterior muscles of the neck. Abolishing these stresses by means of proper exercises and lenses may be beneficial.

Occupational factors must be considered. Students, draftsmen, and bench workers, for instance, may suffer because of prolonged tension on posterior neck muscles associated with leaning over their work.

In acute cases of cervical periarthritis without other associated diseases, intravenous iron in the form of iron cacodylate every two or three days may be a valuable adjunct to physical therapy. The use of salicylates is common practice and needs no comment. Occasionally, codiene or demerol may be necessary for one or two days while physical therapy is being started.

Mention should be made of the technic of local infiltration of anesthetic drugs. Infiltration is directed into painful nodules when present and some outstanding results have been obtained especially in cases with associated neuralgic head pain.⁹ This technic may be used in conjunction with physical therapy in selected cases.

Summary

The objective findings in patients with cervical periarthritis may be meager. The discomfort and the disability associated with this condition may be great. Each patient should be treated carefully and thoroughly with particular attention to the local disease, and the important occupational and postural factors. Relief of symptoms will then be the rule with few exceptions.

7. Pemberton, Ralph, *et al.*: Principles and Practice of Physical Therapy, Vol. 1, Chap. 4, Maryland, W. F. Prior Company, Inc., 1933.

8. Coulter, John S., and Osborne, Stafford, L.: Wavelength in the Heating of Human Tissues by Short Wave Diathermy, J. A. M. A. 110:639 (Feb. 26) 1938.

9. Kelly, M.: New Light on Painful Shoulder, M. J. Australia 1:484 (April) 1942.

MEDICAL NEWS

Dr. Wilson Appointed Director of Physical Medicine

Appointment of Lt. Col. George D. Wilson as director of physical medicine has been announced by Lawrence J. Linck, executive director of the National Society for Crippled Children and Adults, Inc.

"Dr. Wilson's appointment marks another development in the expansion of facilities offered by the National Society," stated Mr. Linck. "He will act in an advisory capacity in the society's program to assist communities throughout the country in meeting the medical problems posed by handicapped persons."

Lt. Col. Wilson is on terminal leave from the army, having served as chief of reconditioning service and of physical medicine at the army's Oliver General Hospital in Augusta, Georgia. In 1937 he was co-winner of the Babcock Surgery prize awarded by Temple University, Philadelphia. He received his M.D. there in the same year and was president of Phi Beta Pi.

Before entering the armed services in 1941 Dr. Wilson practiced medicine in Winston-Salem, North Carolina. He is a graduate of the University of West Virginia having received his A.B. in 1933 and his B.S. in medicine in 1935. He was an instructor at the Louisiana State University medical center at New Orleans.

During his army career Dr. Wilson was chief of physical medicine at both Camp Shelby, Mississippi, and at Oliver General Hospital. He supervised the educational and physical reconditioning of disabled soldiers from all services. Physical therapy work included supervision of work shops, designing special equipment and remedial sport activities.

Dr. Wilson was born in Wellsburg, West Virginia. His appointment with the National Society For Crippled Children and Adults, Inc., is another in a series of appointments of veterans in positions resulting from the expansion of the society. 1946 is the silver anniversary of the society's service to the handicapped.

Dr. Bennett Speaker

Dr. Bennett presented the role of physical medicine at a symposium on poliomyelitis at the meeting in Detroit recently of the American Academy of Pediatrics. Others who took part in the symposium were Dr. Plato Schwartz of Rochester who spoke on the orthopedic aspect of poliomyelitis; Dr. Philip Stimson, New York City, spoke on the pediatric aspect; Dr. Howard Howe of Johns Hopkins who spoke on the neuropathology and Dr. Bronson Crothers of Harvard who spoke of the psychiatric aspects of poliomyelitis.

Pennsylvania Academy of Physical Medicine Presents Round Table Discussion

A round table discussion on the place of physical medicine in general office practice was the program for the regular February meeting of the Pennsylvania Academy of Physical Medicine. Those who took part were Drs. Frank Follweiler, Harold Lefkoe, A. A. Martucci, Alfred Treacy and Maurice Weisblum.

Approved Schools

The Council on Medical Education and Hospitals of the American Medical Association at its meeting on February 10 voted to extend its approval to the six-month emergency course in physical therapy conducted by the Baruch Center of Physical Medicine of the Medical College of Virginia.

At the same time the Council decided to withdraw its approval from the physical therapy schools conducted by the Mayo Clinic and the Cleveland Clinic Foundation Hospital inasmuch as these training programs are being discontinued.

Warm Springs Offers Three Months Graduate Course

Part A. Introductory week. Part B. First six weeks (after Introductory Week).

Monday A. M.—Practice work. Supervised by Plastridge. P. M.—Muscle testing, muscle re-education, Plastridge.

Tuesday A. M.—Practice work. Supervised by Plastridge. P. M.—Theory and discussion and demonstration, Bennett.

Wednesday, A. M.—Practice work. Supervised by Plastridge. P. M.—In-patient rounds and discussion, Bennett.

Thursday, A. M. and P. M.—Observation of staff technicians treatment. (Each student assigned to a different staff technician each week.)

Friday, A. M.—Practice work. Supervised by Plastridge. P. M.—Muscle training, muscle re-education, Plastridge.

Saturday, A. M.—Practice work. Supervised by Plastridge. P. M. (1:00-2:30)—Theory and discussion, Bennett.

Part C. Second six weeks.

The second six weeks will be followed as above, except there will be no classes scheduled for Saturday afternoon, and Tuesday afternoons will be spent on walking reeducation, step climbing and the use of assistive and supportive apparatus.

(Continued on page 170)

ARCHIVES of PHYSICAL MEDICINE

OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL MEDICINE

.. EDITORIALS ..

INTERNATIONAL COOPERATION

Doctor Kovács in his 1945 year book of Physical Medicine makes the following remark: "With the resumption of peacetime clinical study abroad and the reestablishment of international communication it is to be expected that progress reports on work in physical medicine abroad will be available and add their stimulus to the steady increase of its clinical utilization in all departments of medicine." The interchange of ideas between physicians who are interested in physical medicine in this country and overseas was gaining a certain amount of momentum just prior to World War II. Articles by authors, particularly British, appeared occasionally in the ARCHIVES OF PHYSICAL MEDICINE, and in 1941 an issue of the *British Journal of Physical Medicine* was devoted to American writers, subscriptions for our official journal were being ordered by physicians in other countries and subscriptions for the British journal were showing an increase, plans were being made to invite one of England's leading scientists to attend one of our annual meetings and other evidences of cooperation were present, all of which of necessity was suddenly abandoned by the outbreak of the war. Now with the return of interest in civilian activities it is hoped that this spirit of collaboration will not only be renewed but be increased for any and all physicians or scientists who may have anything to contribute to the further development of physical medicine.

In order to encourage a more widespread spirit of cooperation it would seem that the time is now propitious for our Congress of Physical Medicine to set about means so as to become more international in its scope and influence. A group in our organization or a committee might be appointed whose function it would be to foster better relationship among such groups abroad who are interested in our specialty. Most countries have their own national societies or groups which have definite and necessary purposes but unfortunately the ideas and endeavors of these men or the publication of their work is too often confined to their own country.

Other professional groups have been organized along these lines, for example, the International League for the Study of Rheumatism; the surgeons, the pathologists and others have similar societies which have been present for a varying period of years. Surely in a field such as physical medicine where the need for further study and the dissemination of any knowledge is so evident, the exchange of ideas from whatever source could not help but be worth while.

Our official journal, the ARCHIVES, could serve as a means of publishing articles and items dealing with physical medicine or allied subjects from authors from all countries. Invitations should be extended to such writers to prepare papers for publication in our journal and if in a language other than English, translation could surely be secured. The ARCHIVES now has readers in many countries but if a more extensive effort were made to include more information of the work of foreign investigators and clinicians, it would add to its recognition and prestige.

In keeping with this desire to encourage a greater international spirit

in physical medicine, it is perhaps not too optimistic to hope that by 1947 many physicians and scientists from abroad would be able to come to this country to attend our 1947 national convention. This meeting might become the International Meeting with the attendance of men interested in physical medicine from the British Isles, Europe, South America, Australia and elsewhere. There are certainly many men to invite to such a meeting, many who in the past have been responsible for outstanding developments to the progress of physical medicine and from whom in the future further contributions may be expected. One can recall the International Fever Conference of 1936 when investigators from France, Belgium, England and other countries came to New York City and reported their work. It was a most inspiring meeting. If such enthusiasm could be shown for a subject as limited and as new as fever therapy was at that time, why could not at least that much zeal be manifested for the entire field of physical medicine.

The American Congress of Physical Medicine has this possibility now to lead in establishing international cooperation in this field. It should not fail in this opportunity.

TRIBUTE

The American Physiotherapy Association celebrates its twenty-fifth birthday this year. It was January 15, 1921, according to Ida May Hazenhyer¹ that this organization had its humble beginning under the imposing title of the American Women's Physical Therapeutic Association and it was twenty years ago this month that their official publication made its debut. Formed originally as a group of women who had served in World War I, it soon became established as the recognized organization of the physical therapists and today it is the only truly national and representative group of technicians.

Too often and too many men in the medical profession do not appreciate the part the physical therapy technicians play in the treatment of the patients. Even physicians who are vitally interested in physical medicine are too prone to accept the excellence of their work as something which is to be taken for granted. Too few unfortunately, do not know of their work in World War I. Men like Coulter, Granger, McFee and a few others personally saw how they functioned in that war both in the hospitals in Europe and in America and what an enviable reputation they so justly earned. Their task then was infinitely more difficult than now but this in no way deterred them from doing a superior job. When this country became involved in World War II and the Medical Section of the War Department rapidly developed its hospitals, it included the physical therapists in its organizations, however unwisely, merely as lay personnel. During the first few months of the war many of the technicians were sent overseas without the official recognition and protection of the Army, and it wasn't until December, 1942 that the War Department finally granted the technicians the status of commissioned officers in their own Physical Therapy Corps.

Although finally accepted and recognized their lot was anything but easy. In most instances both in this country and overseas they were left to provide for their departments and themselves with little or no help from their commanding officers. They worked long hours, improvised with anything and everything so as to make the department function, fought for spaces to oper-

1. Hazenhyer, Ida M.: A History of the American Physiotherapy Association, *Physiotherapy Rev.* 26:3 (Jan.-Feb.) 1946.

ate which made the proverbial basements seem palatial, cried for more co-operation from the medical officers and struggled against every conceivable obstacle. Of course they succeeded. They secured results. The hundreds of thousands of service men and women who were cared for by these technicians will vouch for this. They were appreciated for the quality and efficiency of their work and honored for their loyalty and devotion. They earned every bit of it.

And then there are those unsung heroes or shall we say heroines who did not go into the armed services whose contribution for the war effort was so remarkable because it was done so willingly and so well. Their part was difficult perhaps even more so than those who volunteered for the Army or Navy since those in the services were buoyed up in their difficulties not only by their own personal satisfaction but by that of public recognition of their sacrifices; but for those that remained, there was no such exaltation. They were forced to work longer and harder hours, the civilian patients were more numerous and much less appreciative, the doctors were more impatient and more tired and the equipment was made to do regardless. The pressure was always there, do more with less consideration!

These women both in service and those who served at home are the technicians who make up the American Physiotherapy Association and the credit they brought on themselves individually reflects to the honor of the organization. It was not only during this period of emergency such as this country has just gone through that these women demonstrated their worth but throughout all of these past twenty-five years. It was the existence of an organization which has persistently stressed the importance of the highest possible standards that such achievements were accomplished. The original members of the association were wise women with principle, courage and foresight who planned an organization with high ethical standards. They and their successors have maintained and improved on these standards throughout all these years. The list of the presidents who served during the past 25 years for the American Physiotherapy Association includes twelve names of outstanding women in this profession, each known for certain distinction; some for their administrative ability, others for their contribution to the technical and scientific aspects of this science and several others for a combination of attributes which mark them as outstanding women in this or any other endeavor.

The science of physical medicine is indebted to this organization for their part in developing it to its present position of distinction and respect. What would physical medicine be today except for the superior workmanship of the technicians and what would the technicians be except for the high standards demanded by this Physical Therapy Association? The influence that this organization has supplied in aiding the progress of physical medicine is perhaps more than they realize themselves. With as glorious a record as has been established in the past twenty-five years by this group it is stimulating and encouraging to anticipate what may be expected in the future.



Medical News*(Continued from page 166)***Physical Medicine at Emory**

The National Foundation for Infantile Paralysis has made a grant of \$167,000 to the Georgia Warm Springs Foundation and Emory University School of Medicine to develop and carry on a teaching, research and service program in physical medicine with particular reference to neuromuscular diseases. The purpose of the grant is to correlate the facilities of the Warm Springs Foundation and Emory University Medical School, so that teaching, research and service in physical medicine can be developed. This is definitely a cooperative agreement between the department of physical medicine at Emory University School of Medicine and the department of physical medicine at the Georgia Warm Springs Foundation. The general direction of the program will be assigned to Dr. Robert L. Bennett, who will be given the title of director of physical medicine and professor of physical medicine, at the Emory University School of Medicine. It is hoped the development of such a program will encourage and guide the proper practice of physical medicine in the over-all care and program in the southeastern states.

Refresher Course Held at University of Kansas

A refresher course in Physical Medicine was held at the University of Kansas School of Medicine and Hospitals, January 21 through 25. There were 34 physicians enrolled and 18 physical therapists and occupational therapists. The majority of the physicians that attended were veterans of World War II.

The program consisted of lectures, demonstrations, motion pictures and clinics held in the Physical Therapy Departments of the University Hospital. The faculty for the course included the following: Dr. Frank H. Krusen, Dr. Howard Rusk, Dr. Earl C. Elkins, Miss Marie Franciscus, O.T.R., Occupational Therapist from Crile General Hospital, Cleveland; Dr. James R. Elliott, Dr. James B. Weaver, Dr. A. Theodore Steegman, Dr. Herbert C. Miller, Dr. M. J. Rumold, Dr. Nicholas S. Pickard and Dr. Gordon M. Martin.

A symposium was held on cerebral palsy and the medical faculty was assisted by Miss Nelle Cummins and a group of the faculty of the DeLano School for Crippled Children of Kansas City, Missouri.

The Problem of Rickets

Rickets is no longer a common disease in Britain, because of improved methods of feeding. A special inquiry by the British Pediatric Society, by arrangement with the Ministry of Health, showed, however, that wartime conditions had produced some increase of the disease. Owing to the lack of sunshine in this country, the deficiency of vitamin D is a nutritional problem. Because

of the mild form in which rickets now occurs, the diagnosis is extremely difficult. When there are only minor bone signs clinical diagnosis may be impossible. In order to prevent rickets it is recommended that babies, however fed, should receive a supplement of vitamin D in daily doses of 500 to 800 international units, given in the form of cod liver oil. For the treatment of active rickets ultraviolet irradiation should be combined with larger doses of vitamin D than those recommended for prophylaxis.

Lieutenant Bert R. Shepard on Tour of Amputation Centers

First Lieutenant Bert R. Shepard, recently assigned to the Office of the Surgeon General as amputation consultant, recently completed a four-week tour initiated by the Surgeon General, in which he visited all Army amputation centers in the United States.

Films concerning both above and below-the-knee amputees made up a part of Lieutenant Shepard's program, with two additional films of the 1945 World Series and National and American League all-star players in action. The film designed to be of special interest to below-the-knee amputees was made by Lieutenant Shepard. It demonstrates his own technic with his artificial leg in playing baseball and basketball and in running the sixty-yard dash which he does in 3.5 seconds.

Signed last spring as a relief pitcher and coach by the Washington Senators following his discharge from the Air Corps, Lieutenant Shepard entered the service again November to work in connection with the Army's program of amputee walking instruction.

Medical Department Physical Therapists

Physical Therapists now being released from active duty with the U. S. Army Medical Department who desire to make application for positions with the U. S. Veterans Administration, U. S. Public Health Service, or any other governmental agency may now apply for such service without waiting for the expiration of their terminal leave from the Army.

Under provisions of Public Law No. 226, approved November 21, 1945, any person serving with the armed forces after May 1, 1940, who has been released under honorable conditions, may re-enter employment of the U. S. Government and shall, at the same time, be entitled to receive pay and allowances from the armed forces for the unexpired portion of such terminal leave at the same rates and to the same extent if she had not entered or re-entered such employment.

The law provides further that, on application to the Secretary of War, remuneration shall be made in a lump sum equal in amount to the pay and allowances to which such person would have

been entitled while on terminal leave for the unused portions of such accumulated and current accrued leave had she not entered or re-entered such employment.

Technical Advisory Services

Appointment of E. Dale Trout as director of an expanded Technical Services Department to coordinate all types of technical advisory services was announced recently by Vice-President W. S. Kendrick of the General Electric X-Ray Corporation of Chicago. Mr. Trout, who holds a Bachelor of Science degree from Franklin College, Franklin, Ind., brings to his new position 18 years of experience in various phases of the company's education and technical service programs.

Savage Named NFIP Director

Joe W. Savage of Charleston, W. Va., recently released from the Army Air Forces where he served three and a half years as a Major in the navigation training program, has been appointed executive director of the National Foundation by President Basil O'Connor.

Prior to entering the Army, Mr. Savage was executive secretary of the West Virginia Medical Association, editing that organization's medical journal and representing it before the state legislature and state governing bodies.

Dr. Newman to Hines Hospital

Dr. Louis B. Newman of Chicago has been appointed Chief of Physical Medicine, at the Hospital of the Veterans Administration at Hines, Illinois. The appointment also includes the department at Vaughn General Hospital which is being taken over by the Veterans Administration. Dr. Newman has just recently been released from the armed forces. He was formerly Commander (MC) U. S. N. R., and Head of the Department of Physical Medicine as well as a member of the Rehabilitation Board at the U. S. Naval Hospital at Oakland, California and Seattle, Washington.

"New Perspectives" Available in Pamphlet

The National Society for Crippled Children and Adults, Inc., has released a new pamphlet entitled, "New Perspectives: The Organization and Development of a Movement for the Physically Handicapped."

School of Health and Physical Education

Indiana University, Bloomington, has announced the establishment of a school of health, recreation and physical education as the first step in the university's postwar development program. The school will have four departments: physical education offering service courses in all schools of the university; health and safety, giving courses in these subjects together with a program of re-

search and graduate study; recreation, coordinating all campus activities and student intramural sports, with courses designed to train directors of community and school recreation programs, and professional physical education, offering technic courses for teachers, also with research and graduate study programs.

Medical Frauds

Fraud orders issued by the Postoffice Department have frequently been the subject of extensive articles by the Bureau of Investigation of the American Medical Association. Following is a brief abstract of one of these fraud orders:

Natural Health Institute. — This enterprise was conducted at Rocky Mount, N. C., by a "Dr." J. Lewis Clinton, a chiropractor and author of so-called health writings. Further, he published two booklets, "Radiant Health Through Normal Elimination" (27 pages) and "Energy Unlimited" (58 pages). These were advertised by means of a circular entitled "Your Health!" The Post Office Department charged that these booklets were misleading and that the sale of them through the mails constituted a fraud on the public. Clinton, however, was given opportunity to appear at a hearing and show cause why a fraud order should not be issued debarring his business from the mails. A Senior Medical Officer for the Food and Drug Administration who appeared as a witness for the government at the hearing testified as to the factors causing constipation, which condition was the subject chiefly dealt with in the first-named booklet. He pointed out that Clinton's pre-sale allegations that his advice would enable patrons to "free" themselves from enemas, laxatives and other "adjuncts" contrasted with his suggestion in the book that if the methods he advocated (going to stool preferably after breakfast and massaging the lower part of one's abdomen in a certain way) failed to work, a mild laxative should be employed or a soapsuds enema used. It was further pointed out that though his pre-sale representation was that "no dieting" and "no exercises" would be required, both dietary suggestions and exercises are included in his book. The witness further showed that different cases of constipation require varying methods of treatment. As to the book "Energy Unlimited," the leaflet advertising it called it "one of the biggest surprises in the health book field, and utterly unlike anything you have ever read," in which "Dr. Clinton presents conclusive evidence to show that chronic fatigue, nervousness, sleeplessness and associated symptoms of nerve exhaustion are not due so much to a lack of energy itself, but to a lack of proper transmission and expression of energy . . . to tensions and 'short-circuits' which squeeze the nerves and decrease the flow of energy. . . ." The government's expert medical witness testified that the symptoms mentioned above are those of practically all diseases; that Clinton's theory of nerve pressure was a distorted one, and that the diet prescribed in his book for the purpose of forming an alkaline balance in the system is diametrically opposed to that of

taking exercise (which Clinton also advocated), since exercise tends to produce an acid condition as opposed to the alkaline-forming diet. Although Clinton did not appear at the hearing, he filed an answer to the foregoing testimony, in which, however, he offered no evidence of the efficacy of the measures recommended in the two booklets mentioned. He did deny any intention to defraud. Nevertheless, the Post Office Department held that the charges against him were entirely sustained by the evidence, and recommended a fraud order debarring him from the mails. This was issued August 14, 1944, against the Natural Health Institute, "Your Health!", "Dr." J. Lewis Clinton, editor and publisher, and W. M. Vaniford, publications department, as well as their officers and agents. — [Reprinted J. A. M. A. 130:370 (Feb. 9) 1946.]

Charts for Muscle Examination Available

All who work with the clinical problems of infantile paralysis have expressed the desire for a practical, uniform method of recording the evaluation of paralytic muscles. To that end The National Foundation for Infantile Paralysis appointed a special committee to set up standards by which the end results of different methods of treatment of the after effects of infantile paralysis could be evaluated.

As part of this effort a simple but comprehensive muscle examination chart has been prepared. This has been studied critically and approved by representative orthopedic surgeons and physical therapists. It has also been accepted by the National Foundation's Committee on Treatment of After Effects.

These muscle charts are now available in quantity from the National Foundation and are being offered without cost to orthopedic surgeons, pediatricians, physical therapists and hospitals where care is given to patients with infantile paralysis.

Artificial Limb Program for Soviet Union

The American Society for Russian Relief, Inc., has launched a million dollar program to obtain needed material for the rehabilitation of amputation cases in the Soviet Union. The program includes the attempt to equip a network of hospitals specializing in the care of amputees in the Soviet Union and a central factory with regional workshops in various Soviet Republics to manufacture artificial limbs. Everything will be supplied, from thousand dollar turret lathes and disk grinders to laundry equipment, surgical instruments and even doctors' and nurses' uniforms. Plans call for a central hospital in Moscow to be supplied with 2,000 beds, laundry equipment to handle 23,500 pounds of wash a day and all necessary medical equipment, including a complete chemical research laboratory. Attached to this hospital will be an artificial limb factory to be equipped with American machines and basic raw materials for the manufacture of limbs, including pressed felt, vulcanized fiber sheets, finishing lacquers, glues and copper nails. Along with basic machinery such as drill presses, du-

plicating lathes, welding machines, riveting machines, electric drills and sewing machines, the agency also is shipping hand tools, such as files, hammers, hack saws, nails and industrial electric vacuum cleaners for factory and hospital use. The project also includes equipping of regional hospitals in the various Soviet Republics with their own artificial limb work shops. After the initial operation at the central hospital and manufacture of the desired limb at the factory, the patient will be sent to the regional hospital nearest his home. Here he will convalesce and the final fitting of the limb will be made. An announcement stated that a number of amputation cases in the Soviet Union is so great that it has not yet been totaled and that civilians, including children, are still being maimed by exploding mines so cunningly buried that they cannot always be detected.

Air-Borne Infection

In the *Saturday Evening Post* of Feb. 16, 1946 there appears an article entitled "War on the Flying Microbes." It gives to the reader much information about the work of William F. Wells, Associate Professor of Air-Borne Infection and head of the laboratory for the study of air-borne infections. This laboratory is supported by the Commonwealth Fund. In the article which is illustrated there is described in popular language the value of ultraviolet radiation and glycol vaporizers in the reduction of air-borne germs. Dr. Wells is assisted by his wife, Dr. Mildred M. Wells, who is a physician and an epidemiologist.

Dr. Weaver to National Foundation for Infantile Paralysis

Dr. H. M. Weaver, Senior Administrative Assistant and Assistant Professor of Anatomy, Wayne University College of Medicine, Detroit, has been named assistant to the medical director of the National Foundation for Infantile Paralysis.

Dr. Weaver's work will be with the National Foundation's research program and fellowship training program for physicians and research workers. Under grants provided by the Foundation, research programs are being carried on in medical organizations throughout the country in an effort to find means of prevention or cure of polio. The professional training program includes fellowships in orthopedic surgery, pediatrics, virology and other fields concerned with polio.

Born in Lancaster, Ohio, in 1909, Dr. Weaver graduated from Ohio State University in 1934 with an A.B. degree, later receiving his M.Sc. and Ph.D. degrees there.

He was on the faculty of Wayne University College of Medicine from 1938 until his appointment and active since 1944 in its administration. He has done extensive writing in connection with research in pathology of nervous tissues, especially as affected by nutrition.

Dr. Weaver is a member of the American Association for the Advancement of Science, The American Association of Anatomists, International Association for Dental Research and Sigma Xi.

University of Illinois College of Medicine

Dr. Douglas A. MacFayden has been appointed Rush professor of biochemistry in the Rush-Presbyterian Hospital division of the University of Illinois College of Medicine. Dr. MacFayden previously was chief of the division of chemistry and physics of the Army Medical Center in Washington. The appointment constitutes an important step in the achievement of an expanded research and teaching program involving the basic medical departments of the Rush-Presbyterian Hospital division.

Three New Assistants to the Surgeon General Nominated by President Truman

Three new assistants to the Surgeon General, Brigadier Generals Raymond W. Bliss, George S. Beach, Jr., and Edward A. Noyes, have been nominated by President Truman to serve in that capacity for a four-year term in their present rank.

Carlisle Barracks Move to Fort Sam Houston Completed

A move involving approximately 6,000 enlisted men and officers was completed March 15, when medical activities of Carlisle Barracks, Pennsylvania and the Medical Section and certain portions of the basic training program at the Army Service Forces Training Center, Fort Lewis, Washington, were transferred to Fort Sam Houston, Texas, Major General Norman T. Kirk, Surgeon General of the Army, has announced.

Eugene Eppinger Appointed Assistant Dean

Col. Eugene C. Eppinger, formerly physician to students Harvard Medical School, Boston, has been appointed assistant dean in charge of courses for graduates. He succeeds Dr. Frank R. Ober, who has been doing this work since 1928. Dr. Eppinger will take over the direction of all courses for graduates, including the refresher courses for returning veterans.

Dr. Seidenfeld to National Foundation of Infantile Paralysis

Dr. Morton A. Seidenfeld, until recently Chief Clinical Psychologist with the rank of lieutenant colonel in the Division of Neuropsychiatry of the Surgeon General's Office, U. S. Army, has been appointed director of psychologic services for the National Foundation for Infantile Paralysis.

In cooperation with the medical director of the National Foundation, Dr. Seidenfeld will inaugurate a research program on the psychologic problems and needs of infantile paralysis patients, and will develop a plan for their psychologic treatment.

Based on modern practice in clinical psychology, the projected work will widen the scope of National Foundation planning for the treatment of poliomyelitis patients, especially during con-

valence, continuing care and rehabilitation.

Dr. Seidenfeld is a Fellow of the American Psychologic Association and of the American Association for the Advancement of Science. He is a member of the New York Academy of Science, the Association for Research in Psychosomatic Problems, the Raushach Institute and the National Committee for Mental Hygiene.

Teaching Fellowship in England for Physical Therapist

Mrs. Evelyn Anderson May, a member of the American Registry of Physical Therapy Technicians has been awarded a fellowship for a year's study in England. Mrs. May has been employed in a U. S. Army hospital in England.

Annual Meeting American Occupational Therapy Association

The 1946 Annual Meeting of the American Occupational Therapy Association will be held at the Congress Hotel, Chicago, August 11 to 15.

The first Occupational Therapy Institute will be held in conjunction with the Convention. This Institute will be an intensive two-day meeting for study, information and discussion in the orthopedic and psychosomatic field of medicine. This will follow the regular convention session and will round out the week for those members remaining for the Institute.

Sun-Kraft Cold Quartz Ultraviolet Ray Therapy Lamp Not Acceptable

In the issue of The Journal, dated June 19, 1943, page 505, the Council on Physical Medicine published a report setting forth its reasons for proclaiming the Sun-Kraft Lamp unacceptable as a "sun lamp."

In view of the renewed inquiries regarding this device the Council has given further consideration to the acceptability of the Sun-Kraft Lamp, which is now labeled "Cold Quartz Ultraviolet Ray Therapy Lamp."

The radiometric findings show that the ultraviolet output of the Sun-Kraft model A-1 lamp, in total intensity, does not meet the Council's requirements for acceptability for use either (1) as a sun lamp (also in spectral quality) for home use or (2) as a therapeutic lamp prescribed by a physician for home use or (3) as an ultraviolet disinfecting lamp.

Furthermore, in addition to the foregoing shortcomings, because of the scientifically incorrect, misleading (even the name "Sun-Kraft" is misleading), and unfair sales promotion; the unsubstantiated claims made; and also because of the recommended inhalation of ozone, which is known to be highly toxic and irritating to the bronchial tract, the Council on Physical Medicine reiterates its declaration of unacceptability of the Sun-Kraft Cold Quartz Ultraviolet Ray Therapy Lamp for inclusion in its list of accepted devices. — Reprinted J. A. M. A. 130:493 (Feb. 23) 1946.

Cease and Desist Orders Abstracts of Federal Trade Commission Release

McFadden 3 Sisters Springs Mineral Waters. — Roy A. Whipple and Mrs. Ruth Carter Whipple, trading as McFadden 3 Sisters Springs, Hot Springs National Park, Ark.; complaint issued April 117, 1943; order issued Dec. 7, 1943. Order directed the respondents, who reside in Winnetka, Ill., to discontinue advertisements representing that their waters or any other products of substantially similar composition will eliminate poisons from the system to any significant extent, or will be effective in removing excess acids and impurities through the kidneys and bladder; that the use of these waters will maintain a proper balance of minerals in the body or that any of the waters is a cure or remedy for the various ailments and diseases enumerated in the advertisements. These consisted of more than twenty, and included arthritis, neuritis, Bright's disease, diabetes, anemia, nervous prostration, high or low blood pressure, gallstones and sinusitis.—Reprinted *J. A. M. A.* 130:531 (Feb. 23) 1946.

Manuscripts Invited for Norton Medical Award

The book publishing firm of W. W. Norton & Company announce that they are again inviting manuscripts for submission to be considered for the Norton Medical Award of \$3500 offered to encourage the writing of books on medicine and the medical profession for the layman. The first such award was made to *The Doctor's Job*, Dr. Carl Binger's book, published last spring, which gave the doctor's point of view on his work. Announcement will be made shortly of the winning book for 1946. Closing date for submission of manuscripts this year is November 1st, 1946. All particulars relating to requirements and terms may be had by addressing W. W. Norton & Company, Inc., 70 Fifth Avenue, New York 11, N. Y.

Twenty-Fifth Anniversary New York Society of Physical Medicine

Saturday, March 16 at the Liederkrantz Club, New York City, the New York Society of Physical Medicine celebrated its twenty-fifth anniversary. "Highlights in Our History" was the title of a report by Dr. Madge C. L. McGuinness and "Progress in Physical Medicine in Twenty-five Years" was presented by Dr. Richard Kovács.

Project for Study of Muscle Started at Richmond

A fundamental study of the physics and chemistry of muscle, the ultimate objective of which is to improve the treatment of veterans who suffered extensive peripheral nerve lesions in the war,

is being carried out at the Baruch Center of Physical Medicine at the Medical College of Virginia. The center is supported by the Baruch Committee on Physical Medicine, founded a year ago by Bernard Baruch, New York philanthropist.

The behavior of muscle tissue and the relations between nerve and muscle remain among the most perplexing fields of physiology, although their importance is obvious from the fact that the human body in action might be considered as a nerve-muscle machine.

There were hundreds of war injuries to arms and legs, especially from land mines, which resulted in severed nerves leading to muscles, followed by progressive atrophy of the muscles themselves.

The basic experimental work here is under the direction of Dr. Ernst Fischer, widely recognized for his fundamental studies on the physiology and biochemistry of denervated muscle. Although possible improvement in treatment of the war wounded seems at present the most important practical application of these studies, any fundamental findings may have a wide application in other abnormalities of the nerve-muscle complex, as for example those found in poliomyelitis.

Dr. Fischer wishes to know what actually happens when muscle atrophies. This might lead to a rational treatment program rather than one based entirely on empirical findings. Preliminary experiments already have shown demonstrable and measurable changes taking place in some of the constituents of muscle tissue.

When nerve fiber is severed, the end cut off from the central nervous system soon dies. The segment still connected with the spinal column survives and starts to grow out again to fill in the gap. Normally this growth is very slow—approximately an inch a month.

The nerve is trying to find its way back to the muscle to which it once was connected. But, unless it connects at once with the cut off segment, it is fumbling in the dark. Nerves, apparently, have no "homing instinct."

In many war injuries there may be a gap of several inches between the segments. The growing nerve cannot find its way across this gap unless it is guided and the only practical way to do this is by nerve grafting. A segment of nerve fiber is grafted across the space, connecting the live, growing nerve with the dead nerve.

The graft itself soon dies, but this makes no difference. The centrally connected segment will grow along the path of the dead graft, its growth will be considerably accelerated, and it will find its way to its appropriate muscle. With best surgery, the nerve grows as much as two inches a month.

Now muscle detached from its nerve supply progressively atrophies, losing its capacity for contraction. If this atrophy progresses very far it becomes essentially irreversible. The sooner the nerve connection is restored, the better the chances for a useful muscle, but the slow rate of nerve growth makes prospects quite dim where there is a wide gap.

Animal experiments have demonstrated, however, that both by massage and electrotherapy, the progressive atrophy of muscle can be delayed significantly, although not altogether prevented. The indicated lines of research are two fold: first, to find methods of accelerating nerve growth, and second, of delaying muscle atrophy as long as possible.

The technic of nerve grafting has been greatly improved by surgeons throughout the world during the war. The second half of the problem is under attack at the basic research laboratory of the Baruch Center of Physical Medicine at the Medical College of Virginia.

Nobody knows at present exactly why muscle atrophy is delayed by massage and electrotherapy. It is assumed that these treatments result in some rearrangement of the long chain protein molecules that constitute such a large part of muscle tissue.

Muscle is a complex tissue. The greater part of its substance, however, is composed of two constituents. It is about seventy-five per cent water and somewhat more than ten per cent a complex

protein known as myosin. Other proteins, for the most part, make up the remainder of the dry weight.

The present effort is to tear down the problem by determining the precise effects of various physical agents on each of these constituents—but principally on myosin. What happens when an electric current, for example, passes through a preparation of myosin? How is the arrangement of the long molecules affected, if at all?

Aside from war wounds, the field in which nerve degeneration and muscle atrophy is best known is poliomyelitis and it may be expected that important light will be thrown on the nature and treatment of the after-effects of this malady. It is somewhat more complex, however, than the wound problem where, in the beginning, only the nerve is affected. There is no certainty that in polio the muscle itself may not be affected in some obscure way by the disease processes, even before the atrophy due to losing nerve connections has started. This possible effect on muscle is one of the problems to be faced in the future.

CORRESPONDENCE

Osteopathy and University Presidents *

To the Signatories to the Petition to President Truman for the Deferment of College Science Students.

Dear Sirs:

In the November 16th issue of *Science* appears a letter signed by you and seven other educators appealing to President Truman to alter certain current Selective Service practices.

In the second paragraph you mention, as deserving deferment, students of "osteopathy" in the same general category with students in such recognized disciplines as medicine, dentistry, pharmacy and engineering. To do so stultifies the entire argument because no American university recognizes osteopathy as a scientifically based healing art, and there is no reason to believe that the biological science faculties of the institutions you represent consider the system of osteopathy to be other than a fraud upon a gullible public. The stupidity or cupidity of some Selective Service officials in originally classing students of osteopathy with the others you have listed in granting deferment several years ago is not an adequate excuse. . . . When university and college heads plead for special consideration for students in the various cults of this type our academic standards and ethics have fallen to a new low. Since when has expediency superseded principle in academic practice? And since when have the institutions you represent and administer given their academic blessing to

medical cultism? If those universities . . . intend to promote osteopathy it is certainly time for American medical and other biological scientists to take stock of their position.

Actually I am confident that the unfortunate implications of the naming of osteopathic students in this way were not apparent to most of you. Nevertheless, the seriousness of its occurrence, even by inadvertence if such it was, can not be over-emphasized in a world in which the layman looks to science for miracles and can not distinguish between scientific fancy and fact because of an inadequacy of background information.

(Signed) MAURICE B. VISSCHER.

Department of Physiology,
University of Minnesota.

Replies to Dr. Visscher *

Eight of the country's leading educators, mostly chancellors and presidents of great universities, addressed to President Truman an "appeal for the deferment of college science students," which appeared in *Science*, 1945, 102, 500-501. Maurice B. Visscher, M.D., addressed an open letter to these educators (*Science*, 1945, 102, 674), expressing the confident belief that the implications of what they had signed "were not apparent to most of you."

If Dr. Visscher wishes to discuss osteopathy, and has the necessary knowledge to do so, that is one thing. But when he ascribes "stupidity or cupidity" to a man of the standing and accomplishments of General Hershey because the latter

* *Science* 102:674 (Dec. 28) 1945.

* *Science* 103:117 (Jan. 25) 1946.

included osteopathic students among those subject to deferment, he shows a total lack of knowledge both of the background of General Hershey's act, and of the established attitude of Federal and state governments for many years.

When the Selective Service law was new, the Office of Production Management studied the situation and recognized the futility of expecting the M.D. heads of the Medical Corps in the Army or the Navy to permit osteopathic physicians and surgeons to take the examinations to demonstrate their fitness for commissions as medical officers. Therefore, it recommended to Selective Service that both osteopathic physicians and surgeons, and osteopathic students, be included among the subject to deferment. Selective Service issued such regulations on July 16, 1941. That it was not a matter of whim or caprice is proved further by the fact that more than 17 months later, in December, 1942, when the regulations were promulgated providing for the deferment of preprofessional students—premedical, pre dental, etc.—pre-osteopathic students also were included.

General Hershey's recognition of the essential nature of the study and the practice of osteopathy . . . consistent with the attitude of the Federal government over many years—except as its intentions are thwarted by men who hold the M.D. degree and happen to be in places of authority, as in the Medical Corps of the Army and the Navy. . . .

Dr. Visscher's failure to recognize the care which university chancellors and presidents use in acquainting themselves with the implications of communications which they address to the President of the United States, and his lack of understanding of what lay behind what he chooses to term General Hershey's "stupidity or cupidity," is matched by his evident lack of understanding of the general governmental background of osteopathy.

The U. S. Employees' Compensation Act provides for payment to osteopathic physicians and surgeons and osteopathic hospitals for the of government employees injured in line of duty.

The U. S. Office of Education recognized the American Osteopathic Association as the accrediting agency for osteopathic colleges and includes osteopathy among the professions concerning which it issues vocational guidance booklets.

Dr. Visscher lives in a land where the privilege of free speech and a free press is often abused

because it is not even required that what one says or writes shall be true.

RAY G. HULBURT,
Editor, American Osteopathic Association, Chicago.

. . . For a scientist to attack viciously a concept about which he knows nothing merely suggests that he has stepped out of his role as a scientist and has become either a politician or an evangelist, in either case his mouthings can be discounted because they represent an emotional outburst and are not a product of his scientific knowledge.

. . . The medical departments of the army and navy, for reasons of their own, consistently refused to commission osteopathic physicians and surgeons as medical officers, although the congress repeatedly implied its wish that they be so commissioned. Because of this situation legislators and selective service officials were unwilling to draft a group of highly trained personnel badly needed, into the services as privates.

. . . Osteopathic institutions are not perpetrating "a fraud upon a gullible public," but are engaged in the serious business of training physicians and surgeons, able to meet the general medical problems of the average patient.

It is time that scientists shake themselves and keep pace with progress that is being made in allied fields before expressing themselves authoritatively about them, in terms and concepts that have long since been outgrown.

THOMAS J. MEYERS, D.O.

Pasadena.

. . . The article is out of place because it is an emotional and untrue discussion of matters which will stand investigation in an orderly, systematic, and scientific manner. . . .

There is abundant evidence that there are just as many pious "frauds" in regular practice in the allopathic cult as afflict the osteopathic school of medicine. But unlike the gentleman we would not be so inaccurate or so uncharitable as to indict the whole allopathic cult because of the undoubted quacks within the fold. We believe that the great majority of the allopathic profession are just as scientific, just as honest, and just as faithful and hard working as the practitioners of the osteopathic school of medicine. . . .

CYRUS N. RAY, D.O.,

*Former Member, Texas State Board of Medical Examiners.
Abilene, Texas.*



BOOK REVIEWS

THE CHEMISTRY OF ORGANIC MEDICINAL PRODUCTS. By *Glenn L. Jenkins*, Dean and Professor of Pharmaceutical Chemistry, School of Pharmacy, Purdue University; and *Walter H. Hartung*, Professor of Pharmaceutical Chemistry, School of Pharmacy, the University of Maryland. Second Edition. Cloth. Pp. 675. Price, \$6.50. New York: John Wiley and Sons, Inc., also, London: Chapman & Hall, Ltd., 1943.

The second edition of this comprehensive text on the chemistry of organic medicinal products is intended for students who have had basic work in chemistry and especially for those in advanced courses in pharmaceutical, chemical, biological and medical science. This edition represents a complete revision of material previously contained and a new chapter on the physicochemical properties of medicinal products has been added. The material in the volume is well organized on a recognized chemical basis. The chemistry of the methods of preparation, the properties and the descriptions of the various groups of products are presented. Brief mention is also made of the modes of administration and the therapeutic uses of most of the substances described. Where possible correlation of chemical structure and physiologic action has been discussed.

The bibliography is given in footnotes, in references at the end of each chapter and in a seven page classified general bibliography at the end of the volume. There is a comprehensive thirty-six page index. The reviewer is impressed with the completeness, the satisfactory arrangement and the lucid presentation of the material in this text. It can be unreservedly recommended to students in the fields mentioned above as well as to medical practitioners who are and should be interested in the chemical nature of the many medicinal substances, old and new, with which they have to deal.

MAN AGAINST PAIN: THE EPIC OF ANESTHESIA. By *Howard Riley Raper*. Cloth. Price, \$3.50. Pp. 337, with illustrations. New York: Prentice-Hall, Inc., 1945.

This is the story of the most humane of all medical blessings and of the biggest and bitterest of all medical controversies. Part one gives the background. The chapter on early narcotics gives many examples. Mandragora (or mandrake), one of the most popular of all agents used to control and prevent pain is believed to have been used by the Babylonians as an anodyne as early as 2,000 B. C. The legendary Helen of Troy, so we find in *The Odyssey*, "cast a drug into the wine whereof they (soldiers) drank a drug to lull all pain." Dioscorides, a Greek surgeon who lived during the first century A. D., refers repeatedly

to the hypnotic and narcotic effects of mandragora (the ancient equivalent of our modern belladonna).

In an interesting chapter "Those Who Came Close" the author discusses the work of many men who are seldom given mention in the history of the discovery of anesthesia. Hickman, an English physician born in 1800, had an amazing method of depriving an animal of oxygen, that is to say, to establish a state of unconsciousness caused by asphyxiation. The next man following Hickman to come near to making the discovery was also an English physician, Robert H. Collier, who combined mesmerism with the use of drugs. He mixed poppyheads and coriander with alcohol and administered it by inhalation. Collier was primarily an advocate of mesmerism.

"And then came Wells and Morton and a chemist named Jackson. And they brought us anesthesia. And Wells, who asked only for recognition, died with but a paltry crumb of it; and Morton who wanted money, got it, but spent it again in his eagerness for more and died poor; and Jackson, who prided himself on his intellect, died in an insane asylum."

Who was the discoverer of anesthesia? Dr. Raper gives us a wonderful story of this subject, written in a popular style that nevertheless does not impede scientific accuracy. "Man Against Pain" is the outcome of twenty years of research and achieves a blend of scholarly truth, humor and dramatic narrative.

There are many chapters on perennially alluring subjects such as the uses of new gases in anesthesia. There is described the discovery of ethylene anesthesia by Dr. Arno B. Luckhardt, Professor of Physiology of the University of Chicago because he was called on to investigate the killing of carnations in a greenhouse by illuminating gas from leaking pipes.

In the book is presented an interesting story of anesthesia from the ancient legend of the whack on the head to produce unconsciousness to the streamlined operation of today.

PATHOLOGY IN SURGERY. By *N. Chandler Foote*, M.D., Professor of Surgical Pathology, Cornell University Medical College; Surgical Pathologist, New York Hospital. Cloth. Price, \$10.00. Pp. 511 with 368 illustrations in black and white and 20 subjects in full color and 10 plates. Philadelphia: J. B. Lippincott Co., 1945.

An interesting sentence in the first chapter of the book is worth quoting since this idea is one of the underlying motives of the work, "This subspecialty (surgical pathology), differs radically from its parent specialty, general pathology, in one important particular: it deals with the future rather than the past. It is not so much what was

wrong with the patient as it is one of prognosis as to what will happen to him in the future of a given lesion." The book is written as an adjunct to a text of general pathology. It is intended as a guide for the surgeon or pathologist in the examination of specimens removed at operation. The various systems of the body as well as such tissues as fibrous, muscular, bone marrow and others are presented with consideration for the pathologic lesions which are seen by the surgeon. Particular emphasis is justifiably given to tumors of different types because of their importance diagnostically.

The description of various diseases including brief remarks as to etiology, symptoms and signs is too sketchy and occasionally misleading and adds nothing to the purposes of the book; however, this is a minor fault. The pathologic observations are clearly described and orderly presented and with the aid of numerous and well reproduced illustrations, the volume should be of particular value to the student, surgical resident and surgeon.

SURGICAL TREATMENT OF THE MOTOR - SKELETAL SYSTEM. Supervising Editor: *Frederic W. Bancroft*, A.B., M.D., F.A.C.S., Associate Clinical Professor of Surgery, Columbia University; Attending Surgeon, New York City and Beth David Hospitals. Associate Editor: *Clay Ray Murray*, M.D., F.A.C.S., Professor of Orthopedic Surgery, College of Physicians and Surgeons, Columbia University; Attending Surgeon and Chief of the Fracture Service, Presbyterian Hospital and Vanderbilt Clinic, New York City. Fabrikoid. Two Volumes. Pp. 1254, with 1,063 illustrations. Price, \$20.00. Philadelphia: J. B. Lippincott Company, 1945.

These two volumes represent up-to-date and authoritative opinions on what is usually called orthopedic surgery. Contributions are made by forty-two separate authors well known in the field. In spite of the necessary diversity of style and in some instances of opinions, there is rather good coherence of the work as a whole due to the careful editing including the insertion of frequent cross references and comments. The subject matter is divided into sections on congenital deformities; paralytic disorders; affections of back, muscles, fasciae, tendons, bursae and ganglia; new growths; diseases of bones and joints; and amputations in volume one. Volume two is largely devoted to fractures and dislocations. Other chapters deal with sprains and muscle and tendon injuries, birth injuries and, in a general way military surgery.

Illustrations are numerous and generally excellent without excessive reproductions of roentgenograms. The amount of detail of surgical technique varies considerably with different authors and is not all inclusive enough to serve as a single reference work for the inexperienced surgeon. Physical therapy is most commonly treated in a casual way without adequate detail to allow the reader to determine what the correct prescription

should include or the frequency and duration of treatment. A separate chapter on this subject would be a welcome addition.

This text is highly recommended for the general and orthopedic surgeon and is also a valuable reference source for specialists in Physical Medicine.

PREVENTIVE MEDICINE AND PUBLIC HEALTH. By *Wilson G. Smillie*, A.B., M.D., D.P.H., Sc.D (hon.), Professor of Public Health and Preventive Medicine, Cornell University College, New York, N. Y. Cloth. Pp. 607. Price, \$6.00. New York: The Macmillan Company, 1946.

The author makes a distinction between preventive medicine, a function of the individual in promotion of personal, and family health as a community function. The text is dedicated to a remarkable man, Mr. Lemuel Shattuck, a Boston bookseller who developed an interest in preventive medicine and public health. He was a member of the Massachusetts State Legislature and made an extensive study of public health in Massachusetts. His report was published in 1850.

The major thesis of the book is that the physician who is in practice has an obligation to his patients and to his community to prevent illness and to promote family and community health. The text departs from previous ones in the fact that it gives limited consideration to matters formerly presented extensively in courses of hygiene. It does not discuss to any great extent the sanitary engineering features of public health procedures.

There is discussed environmental sanitation; communicable disease control; child hygiene; adult health protection and promotion; and last but not least, public health administration with a presentation of the adequacy of medical care and a program of nation wide medical care. The author emphasizes the fact that the teachings of preventive medicine will be most effective if they are integrated with the teaching of clinical medicine and that they should also be integrated with the work of the official health services of the community. The continuity of instruction in those methods that may be employed in the home for prevention of illness and promotion of health can best be presented to students of medicine by the public health nurse, the social service worker, the epidemiologist, the school physician and other personnel of the health department since they are in the position to follow the individual situations from the home, through the clinic, to the hospital and back again along the same path.

This is a textbook intended simply as a guide to further reading and investigation. Therefore a list of references and suggested reading is found at the end of each chapter numbered in accordance with the figures in the text. The book can be recommended to the practicing physician because it incorporates the principles of preventive medicine into the daily clinical activities of the practitioner, links up his work with that of the public health agency and points out the important function of the private physician in public health programs and his role as health adviser to the family.

PLASTER OF PARIS TECHNIQUE IN THE TREATMENT OF FRACTURES AND OTHER INJURIES. By *T. B. Quigley*, Lieutenant Colonel, Medical Corps, Army of the United States; Instructor in Surgery; Harvard Medical School (in absentia); Junior Associate in Surgery, Peter Bent Brigham Hospital, Boston (in absentia). Cloth. Price, \$3.50. Pp. 107 with over 100 illustrations. New York: The Macmillan Company, 1945.

This is a small monograph written for the purpose of describing various technics in the use of plaster of paris in the treatment of fractures and other traumatic injuries. The author points out that the plaster cast is the best splint used by the surgeon as it is cheap and durable when properly applied. He points out that the application of plaster of paris casts has been called art but he believes it is a craft and it certainly can be learned by anyone of reasonable intelligence. The author describes the technic of the use of plaster of paris; however, he does not give the indications for the use of plaster of paris and he does not discuss the lesions to be treated. He discusses all types of technics of application but he has tried to emphasize technics that can be used without elaborate apparatus.

The book is divided into several parts. In the first part of the book, the author considers the materials to be used, the methods of fixation of the parts before application of plaster, padding, technic of application, care after application of the cast, cutting and removing the cast and management in cases of sepsis.

In the second and third portions he discusses the applications of casts to the upper and lower extremities, and describes almost all types of casts to be used on the various parts of the arm and leg. In the fourth part he describes the application of plaster jackets for immobilization of the cervical, thoracic and lumbar segments of the spinal column. The description of the technics of applications has been prepared carefully and meticulously. The book is well illustrated and indexed. It should be a valuable monograph for physicians interested in orthopedic surgery or for the general surgeon who has to treat a certain number of injuries of bones.

MEN WITHOUT GUNS. By *DeWitt Mackenzie*, War Analyst of the Associated Press; Descriptive Captions by Major *Clarence Worden*, Medical Department, U. S. Army; Foreword by Major General *Norman T. Kirk*, Surgeon General, U. S. Army. Cloth. Price, \$5.00. Pp. 152, with 177 drawings, including 118 plates in full color by famous contemporary artists. Philadelphia: The Blakiston Co., 1945.

This book is the record of the great work of the Army Medical Corps in the war. It is a true story of the men who fought without guns to save human life, the story of the work on the battlefields and in the hospitals of Europe and Asia. General Kirk in his foreword states: "Because of the heroism and skill of the men and women portrayed between the covers of this book, countless thousands of our fighting men have survived wounds that would have meant certain death in the last war." A dozen American artists braved the hardships and perils of war to make the notable series of historical paintings reproduced from the Abbott Collection of Paintings, now the property of the U. S. Government. The book is recommended as an authentic contemporary history of Army Medicine in the war.

A HANDBOOK FOR DISSECTORS. By *J. C. Boileau Grant*, Professor of Anatomy, University of Toronto, and *H. A. Cates*, Associated Professor of Anatomy, University of Toronto. Second Edition. Cloth. Pp. 390, illustrated. Price, \$2.50. Baltimore: The Williams & Wilkins Co., 1945.

Most students desire an inexpensive guide which they can use without too much concern for its ultimate condition, but which, containing enough information for the identification and exhibition of any structure met, relieves them of the necessity of consulting a more valuable book at an inopportune time. The book is divided into seven chapters, introduction, the upper limb, the abdomen, the lower limb, the thorax, the head and neck and the brain. In the introduction it is explained that the chapter on the brain is not intended for the advanced student. The popularity and need for the book are evident in the number of printings which have been made.

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PHYSICAL MEDICINE ABSTRACTS

The Treatment of Compound Fractures of the Femur. Ralph Soto-Hall, and Thomas Horwitz.
J. A. M. A. 130:133 (Jan. 19) 1946.

Exercise therapy of the thigh muscles should be started as soon as the wound is healed. Static exercises, such as quadriceps setting, can be done in a Thomas splint suspension or in a plaster spica. These exercises should be repeated throughout the day and should be done with considerable force in order to be efficacious. Remedial exercises should at first be given to correct the atrophy and later to produce agility, coordination and endurance. It is important to separate these two phases and to maintain in one's mind the important principle that exercise therapy must have resistance to produce power and hypertrophy, and repetition of movement to lead to endurance. Application of exercise on this basis has led to the most encouraging results that we have seen. Capt. Thomas DeLorme has applied the paraphernalia of professional weight lifters, consisting of an iron boot with attached bar bells, in order to produce resistive exercises for these femoral fractures. This has led to a remarkable increase in muscle power and in stability of the knee, with a secondary increase in joint motion. This change from the passive to active exercise offers hope for the future, when thigh muscles are seen in the injured side which may at times have a greater circumference than those of the normal thigh. Because of the ability to introduce exercise therapy so much earlier, cases which have had a successful delayed wound closure result in better function.

Early and adequate debridement is the most vital factor in the successful treatment of a compound wound.

An analysis of 163 fractures of the femur treated in various theaters of war indicates that extremely gratifying results are being obtained with the conservative treatment of traction in balanced suspension. There has been a low incidence of sepsis and a high percentage of bone union without deformity.

The use of early internal fixation in the presence of an open wound is accompanied by greater danger of complication. When indicated, in a few selected cases, internal fixation is safer if performed soon after the healing has been completed following secondary closure. The operation should be performed through a separate longitudinal incision with temporary counter drainage. When the type of fracture permits, multiple screw fixation is superior to the use of plates because of lessened surgical trauma.

The early use of active exercise, with carefully supervised resistive exercise during convalescence, offers a hopeful opportunity for the improvement of knee function.

Fracture of the First Cervical Vertebra, Complicated by Cervical Rib. Albert P. Guadagni.
J. A. M. A. 130:277 (Feb. 2) 1946.

Fractures of the cervical vertebrae are not unusual. Fractures of the first cervical vertebrae are fairly rare.

B. R., a Negro aged 40, admitted to St. Luke's Hospital to the service of Drs. G. D. Delprat and Alanson Weeks on Dec. 15, 1944, had been struck on the head by a sack of grain. X-rays showed a fracture of the first cervical vertebra near the junction of its posterior and middle thirds, the fragments being in satisfactory position. Also there was a long rib attached to the right transverse process of the seventh cervical vertebra.

Preliminary treatment consisted of head traction, with only slight relief, and hot compresses to his painful shoulder. On December 19 he was placed in a plaster jacket with a helmet included, this holding the head in slight extension and with great comfort to the patient. On December 28 he was allowed up in a chair and after a few days was able to walk. The patient was subsequently discharged ambulatory.

On Feb. 9, 1945 the cast was removed and x-ray examination at this time showed the fragments to be in good position with callus present. A plaster (Thomas) collar was then applied, this being split after eight weeks to allow physical therapy three times weekly, the collar being re-applied after each treatment. After a month the collar was removed permanently. X-ray examination on March 7 showed partial bony union with the fracture line still visible, and a film on May 4 showed almost complete bony union.

At present the patient still has physical therapy three times weekly for residual stiffness and slight pain in the neck. Rotation of the head is limited about 20 per cent. He has occasional ulnar paresthesia in the right hand apparently due to the presence of the aforementioned cervical rib.

The Heart in Training and in Excessive Training. A. Delachaux; M. Mamie, and G. Aymon.
Cardiologia 9:173, 1945.

Delachaux and his coworkers show that physical training produces a number of changes in the human body. In sports involving great endurance changes occur particularly in the lungs, the circulatory apparatus and the products of cellular respiration. Some of these changes protect the heart against overstrain. In the well trained subject the peripheral resistance of the circulation is diminished by neurovascular regulations, while a denser capillary network and a high intracellular hemin level create optimal conditions for metabolic exchange between blood and cells. Consequently the same amount of cardiac energy will supply more oxygen to the periphery in the

trained than in the untrained organism. The heart muscle undergoes changes similar to the skeletal muscle changes. Greater vascularization, increase in cellular hemins (which carry and store oxygen) and increase in respiratory products insure protection against oxygen deficiency during exertion. The heart undergoes hypertrophy and dilatation which involves particularly the length of the heart rather than the transverse diameter. This dilatation enables the heart to deliver a large quantity of blood to the periphery without greatly accelerating its rate. Large "athlete's hearts" are rarely observed; at rest their walls are relaxed and show only mild pulsation. During exertion, however, these hearts contract normally and reduce their volume, expelling their residual blood into the circulation. This type of heart is rare; it represents a highly efficient phenomenon of adaptation to exertion and is peculiar to certain constitutional types; it has no pathologic significance. When intensive training ceases, the cardiac volume decreases gradually. After years of an athletic career, the heart of the well trained athlete may show no clinical change, except perhaps an unusual tolerance for exertion. It is the exception for maximal athletic training to cause heart damage in the initially healthy subject. Systematic examination of a number of overtrained athletes revealed only neurovegetative disturbances, which subsided when excessive training was stopped. The "forced" or overstrained heart is the result of an earlier defect aggravated by the athletic exertion. This defect may have been the result of myocarditis, coronary sclerosis, arterial hypertension, anemia or neurovegetative or endocrine factors. — [Abst. J. A. M. A. 130:1811 (Jan. 19) 1946.]

Effect of Fatigue, Chilling and Mechanical Trauma on Resistance to Experimental Poliomyelitis. S. C. Levinson; A. Milzer, and P. Lewin.
Am. J. Hyg. 42:107 (Sept.) 1945.

Levinson and his associates found that monkeys subjected to exhausting exercise or to chilling during the incubation period of experimental poliomyelitis developed a higher incidence and more severe paralysis than controls. Monkeys subjected to trauma of one or more limbs during the incubation period of experimental poliomyelitis showed no correlation with the location of the paralysis, and the severity and extent of paralysis did not differ from the controls. The incidence and severity of paralysis was significantly greater in monkeys inoculated with the virus during the summer months.

Damaged Intervertebral Disk; Early Diagnosis and Treatment. E. J. Crisp.
Lancet 2:421 (Oct. 6) 1945.

Crisp states that clinically cases of damaged intervertebral disk are distinguished by extreme and persistent spasm of the lumbar portion of the erector spinae muscle and hamstring spasm of less severity. When the patient stands erect, little abnormal is noted beyond a slight increase in

the lumbar curve, but on bending forward to touch the toes lumbar spasm becomes obvious. This is sufficient to prevent forward flexion in the joints of the lumbar spine, for there is movement only at the hip joints and the upper dorsal region. The patient will complain of aching lumbar pain, which is aggravated by movement and coughing and often radiates into the groin. There is tenderness to deep pressure over the sacroiliac joint and the interspinous ligament of the affected segment. The sacroiliac tenderness often develops first; this may explain diagnostic errors. The author treated these cases by complete rest, either in bed or in a plaster jacket. Results in the cases so treated have been satisfactory. The patients have lost their lumbar pain, they have not developed sciatica and they have been discharged from the hospital in six to eight weeks with some residual, but permanent, stiffness of the back. Cases which escape diagnosis until after the onset of sciatic pain may be divided into two groups, depending on whether the annulus fibrosus is partially or completely ruptured. The former group may be recognized by the fixed lumbar lordosis, the latter by the fixed lumbar kyphosis. Both groups usually respond well to immobilization in a spinal jacket.

Short Leg Backache. John M. Butler.
J. Lancet 56:11 (Jan.) 1946.

The symptoms of which these patients complain are many and varied. Pain in some region of the back is the most common and next in frequency is nervousness and easy fatigability. Other complaints are inability to sleep, pains radiating around the chest, pains in the legs and knees, suboccipital head and neck pains and pains in arms and shoulders. Pain of sciatic radiation is frequently encountered. In the past three months seven patients with sciatic pains have been cured by the therapy outlined below.

The short leg is a common cause of muscle imbalance or of the so-called postural imbalance in an apparently otherwise healthy individual.

Many of these patients who come to seek relief from backache can be diagnosed merely by careful observation of their gait and standing habits. In men, one frequently sees that the belt of the trousers does not set parallel with the floor but instead, tips to one side. In women, one hip is more prominent and the hollow of the flank is less on one side. One shoulder is, almost without exception, carried low and if fairly snug clothing is worn, one can notice the scoliosis in the back. In watching these patients walk, it is very easy to notice the heavy step on the short leg side.

In examining these patients unclothed, all of the above mentioned findings are exaggerated and more clearly seen except those in reference to the way clothing is worn. In addition to these, one can readily detect spasm along the back muscles by palpation. Also, one finds the patient must be asked to stand squarely on both feet for he is prone to stand with the weight entirely on one leg and use the other merely as a balance prop. Another finding in these cases is the uni-

lateral development of lower extremity varicosities. The ankle valgus is usually on the short leg side, whereas it has been impossible to establish a rule for the side in which the varicosities develop. It seems that varicosities develop according to the standing habits of the individual—some prefer standing on the longer leg, others on the shorter one.

In further checking, one will notice that the posterior spinous processes fail to fall in a straight line. As pointed out by Sever, the posterior spinous processes should align under a weighted string so held that the lower end hangs in the gluteal cleft.

After the amount of shortening has been determined, the patient is instructed to compensate for this shortening by one of the following methods. In women, the advice varies with the height of heels they are accustomed to wearing on their shoes. A Cuban type heel fortunately is more commonly encountered and lends itself more readily to alteration. To compensate for one-half inch difference they are asked to have one-fourth inch put on the heel of the short leg and remove one-fourth inch from the heel of the long leg shoe. Often one can place a one-fourth inch lift on the inside of the short leg shoe. Any arrangement of alterations—adding to a heel, cutting off a heel or a combination of these two, or pads placed under the heel in the shoe will usually accomplish the purpose in women, who are more used to walking with the weight thrust more toward the metatarsal heads.

In men, one cannot as a rule make great changes in heel heights without running into difficulty. Consequently, men are advised to have the shoe on the short leg side half-sole and then make the heel adjustments where the difference is one-half inch. When the leg shortness is greater than one-half inch, it is better to put more lift on the sole rather than to make too much change in the heels alone.

Shock and Refrigeration. Lyman Weeks Crossman, and Frederick M. Allen.

J. A. M. A. 130:189 (Jan. 26) 1946.

The unique simultaneous inhibition of pain, shock, exudation, infection, necrosis and intoxication recommends refrigeration as an ideal treatment for burns, which can also be combined with other treatments as desired. Plunging into cold water or applying ice not only gives the quickest emergency relief of pain and inflammation but also reacts most favorably on the later course.

The effective relief of sprains by superficial chilling with ethyl chloride can presumably be equaled by ordinary refrigeration, with the advantage of deeper penetration if desired. Anesthesia by refrigeration without a tourniquet, preferred by some surgeons for gangrene amputations, can serve for plastic and other superficial operations in nonsclerotic cases. Evidence in favor of ice application as part of the routine treatment of snake bite and of all envenomed bites and stings is the protracted absorption of penicillin from chilled areas and the protection

of rabbits from lethal quantities of mustard gas.

Experimentation during the past six years has revolutionized the treatment of shock by substituting temperature reduction for the previous practice of warming, and replacing the former colloid or plasma concept with fluid therapy chiefly in the form of large volumes of salt solution.

Many forms of trauma can be benefited by the unique power of cold to control simultaneously pain, shock, exudation, infection, necrosis and formation and absorption of toxins. Specially important applications are to the treatment of burns and military surgery in general.

The Expanding Field of Physical Medicine. F. H. Krusen.

Proc. Staff Meet., Mayo Clin. 20:497 (Dec. 26) 1945.

It is becoming more and more apparent that physical medicine is expanding rapidly and that in the future, it will encompass a broad and at present considerably neglected phase of medical practice. As defined recently by the Council on Physical Medicine of the American Medical Association, physical medicine includes the employment of the physical and other effective properties of light, heat, cold, water, electricity, massage, manipulation, exercise and mechanical devices for physical and occupational therapy in the diagnosis and treatment of disease. In one sense physical medicine is really applied biophysics.

As it is now developing, physical medicine is progressing into three major fields: (1) physical therapy and the employment of physical agents in diagnosis, (2) occupational therapy and (3) reconditioning of the convalescent patient. Physical agents are employed not only in therapy but also in diagnosis so that there are interesting developments not alone in the definitive treatment of disease by physical agents but also in the employment of physical procedures as an aid in diagnosis.

Observations on the Treatment of Infantile Paralysis in the Acute Stage. John A. Toomey.

Canad. M. A. J. 54:6 (Jan.) 1946.

Putting a patient in a fixed cast and keeping him there does not allow for maintenance of circulation and nutrition to the best advantage. Such treatment will probably do the patient harm; physical therapy and muscle reeducation cannot be started early enough.

No one has demonstrated that immobilization for short periods of time, a few weeks or so, harms the patient. If, in addition, the patient is given physical therapy daily, the results will be good.

Good results can be secured with the Kenny treatment. Her patients are lax. Statistics may not always give a good idea as to the advantages conferred by her method, but here again the results are not due to any particular therapy but

to persistent physical therapy and to the long time she is able to control the patient. The method is expensive, requiring a large number of nurses and technicians. This is beside the point, however, if it were perfect in all instances, but it too has its failures.

No matter what treatment is applied, the results will depend on the enthusiasm, the knowledge, the patience and the perseverance of the individual who cares for the patient. Such an individual will get good results no matter whose method is employed. Of course, he must have the cooperation of the patient.

In brief, treatment should be in the hands of one who has patience and persistence and who employs good physiotherapy.

Effect of Temperature on the Experimental Production of Ulcers in the Intestines of Dogs.
Robert L. Driver.

Am. J. Digest. Dis. 12:395 (Dec.) 1945.

The average time for perforating ulcers to occur clearly demonstrated that the lower the temperature the less the digestive effect of the enzyme solution on the intestinal mucosa. In half the experiments where the temperature of the solution was 50 C., the solution was renewed at one-half hour instead of one hour. The result of this cooling was to increase the time for perforation from 133 minutes to 176 minutes.

The digestive action of a 0.1 per cent pepsin in N/10 HCl solution on intestinal mucosa was reduced by lowering the temperature of the solution.

Principles in Early Reconstructive Surgery of Severe Thermal Burns of the Hands. Byron Smith; Carleton Cornell, and Charles L. Neill.
Brit. J. Surg. 33:159 (Oct.) 1945.

The total period of splinting and postoperative elevation is five days. Meticulous care and abundant saturation is required to prevent the separation of the graft from its recently acquired bed. Cocoa butter is applied to the surface of the graft and further dressings are eliminated. During the daytime while the patient is awake the graft needs no protection other than good cooperation of the patient. At night the graft is covered with a well-padded loose dressing to protect the hand from trauma during sleep. The submersion baths are resumed three times a day. Elevation is continued when the hand is at rest. The rehabilitation exercises are directed towards flexion and extension.

The ease with which the motion of adduction of the thumb to the extended fingers is performed cannot be selected as a criterion of good function. Restoration of normal function in a hand is dependent upon a wide range of motion in the interphalangeal joints. Unless the patient is specifically instructed, a tendency to substitute motion in the metacarpophalangeal joints for flexion and extension of the interphalangeal joints is outstanding. Neglect of early full motion of the interphalangeal joints is an open invitation to perma-

nent dysfunction and deformity. Encouragement and constant attention is demanded if good functional results are expected.

Elevated healed edges around the graft at the junction with normal skin is only of temporary cosmetic concern. Spontaneous leveling of the margin and blending of the graft with normal skin occurs during rehabilitation and requires no surgical intervention. Transient cyanosis in the graft during the postoperative period is not uncommon. The appearance of a serous subepithelial bleb is an indication of excessive dependency of the extremity or activity beyond the tolerance of the graft. Elevation should be increased, activity decreased and bullae aspirated. Occupational exercises and clay modeling are extremely effective.

Deformity and disability resulting from thermal burns of the hands may be reduced by early management. Regulations directing the proper use of protective fire-resisting apparel will reduce burned hazards in military operations. Characteristic war-time burns of the hand involve the tissue over the dorsum of the hand and fingers, with a tendency to encircle the wrist. Initial treatment is directed toward prevention of infection and restoration of function. Infection and exposed tendons and bones do not contraindicate early grafting. Radical excision of slough, granulation tissue, and poorly developed epithelium prepare the recipient surface for a split-thickness graft.

The graft is sutured in place under the tension of normal skin.

Postoperatively, dressings and splints are removed on the fifth day. Rehabilitation exercises are resumed until maximum functional activity is accomplished.

Late Rupture of Extensor Pollicis Longus Tendon Following Colles' Fracture. Frederick M. Smith.

J. Bone & Joint Surg. 28:59 (Jan.) 1946.

Late spontaneous rupture of the extensor pollicis longus tendon following Colles' fracture is a rare complication, and one that is not often recognized. This paper adds five cases to those previously reported in the literature. The rupture is, in all probability, due to aseptic necrosis of the tendon, following injury to its blood supply. The history and physical signs are characteristic. Return of function without operation cannot be expected. With operation, a good to excellent return of function may be expected. Stress has been laid on the dual function of the oblique pull of the extensor pollicis longus tendon and a method of repair has been suggested to accomplish this functional restoration.

Occupational Therapy and the Ageing Person.
Louis J. Haas.

West Virginia M. J. 42:13 (Jan.) 1946.

We should have collateral vocations during our active, middle years of life, so that we may replace the one with the other, should necessity arise. When we have to give up what we have been doing as a means of livelihood, life should

not look like a blank wall ahead, but as an obstacle that we can overlap, outflank, or tunnel under with an associated asset or interest. In other words, we should develop in youth interests of more than one kind, which we may call hobbies, if you will, but which I prefer to call collateral vocations, which we may not develop to the extent that we do our actual business or profession, but which should be sufficient for us to consider as projects to work on when we can find the time in the later decades of life. They should be consistent however, and not too taxing for oncoming physical infirmities. They should be more cerebral than muscular. They should lead us to the philosophy that life will never be long enough for us to accomplish all we want to do. We should feel we have never finished. When we cease to habitate the surface of this terrestrial sphere, we should depart with the satisfaction that we have worn out rather than rusted out. Remember, the more you use your brain, the easier it becomes to do so.

Thrombosis of the Deep Veins of the Lower Extremities. David I. Abramson.

Illinois M. J. 38:298 (Dec.) 1945.

In the treatment of the acute stage of phlebotrombosis and thrombophlebitis, no unanimity of opinion exists. For practical purposes, the types of therapy can be divided into two groups, namely, conservative and radical measures.

With respect to conservative therapy, the simplest procedure is elevation of the lower extremities. This is generally carried out immediately after the onset of the acute attack. Flexion of the hips should be avoided, and the feet should be kept higher than the face, both of which objectives can be achieved by raising the foot of the bed. This step helps to relieve the edema by favoring lymphatic flow. Heat may be applied at the same time, in the form of a heat tent or hot compresses, in order to increase the local blood supply and thus counteract the periphlebitis.

The use of compression devices, such as elastic adhesive plaster, Ace bandages, or Unna's boot, has a definite place in the treatment of thrombophlebitis.

After the application of the compression bandage, the patient is encouraged to move his legs. The possibility of dislodging a portion of the thrombus by such a procedure has been suggested, but this view does not seem to have been substantiated by clinical reports. As the signs of thrombosis disappear, exercise of the legs and thighs, preparatory to getting up, is increased.

The Therapeutic Efficiency of Ultraviolet Light Apparatus. A Comparison of Tests. B. C. Elliott.

Brit. M. J. 4433:883 (Dec. 22) 1945.

Apart from laboratory technics, two practical methods of detection and measurement of therapeutic ultraviolet radiation present themselves. These employ, respectively, the barrier-layer photovoltaic cell and the vacuum or gas-filled photo-emissive cell. The former develops a small

voltage, while the latter emits electrons and becomes conductive, when subjected to radiation. Accordingly the indicating instrument used with the photovoltaic cell takes the form of a sensitive low-resistance microammeter connected directly across the cell; the photo-emissive cell, on the other hand, requires a source of direct voltage for its operation. It is customary to use a load resistance in series with the photo-emissive cell and its source of supply; variations in potential across this load are applied to the input of a suitable D.C. amplifier, in whose output circuit the indicating instrument (milliammeter) is connected.

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Relation of Ultraviolet-Induced Mutations to Speciation in Dermatophytes. C. W. Emmons, and Alexander Hollaender.

Arch. Dermat. & Syph. 52:261 (Oct.) 1945.

Four types of mutants induced by monochromatic ultraviolet radiation of conidia of *Trichophyton mentagrophytes* were distinguished after they had been carried in subcultures for a period of five years. Some of these are closely similar to certain varieties of *Trichophyton* which occur naturally and are recognized as being closely related but are usually placed in different species. One mutant approaches the "endothrix" species *T. violaceum* but is not considered identical with it. These observations support the hypothesis that species lines have been drawn too narrowly among the dermatophytes and that some so-called species may have a mutational origin.

Electric Ophthalmia. Lewis K. Woodward.

U. S. Nav. M. Bull. 46:248 (Feb.) 1946.

The main complaint was a burning sensation or pain in one or both eyes, which was frequently accompanied by a feeling of having a foreign body in the eye. Photophobia, lacrimation and blepharospasm were pronounced in many cases.

Treatment consisted of irrigation of the eye with mild boric acid solution and instillation of a solution containing pontocaine hydrochloride and neosynephrin hydrochloride. In many instances an ointment containing 2 per cent butyn sulfate was also employed. Relief was obtained, especially when there was edema of the lids, by application of cool boric acid compresses. The response of all cases to therapy was prompt; in many men all signs and symptoms had disappeared within twenty-four hours, and in only three cases was there any inflammation present after forty-eight hours of treatment. One man required a moderate amount of codeine and barbiturates for one day.



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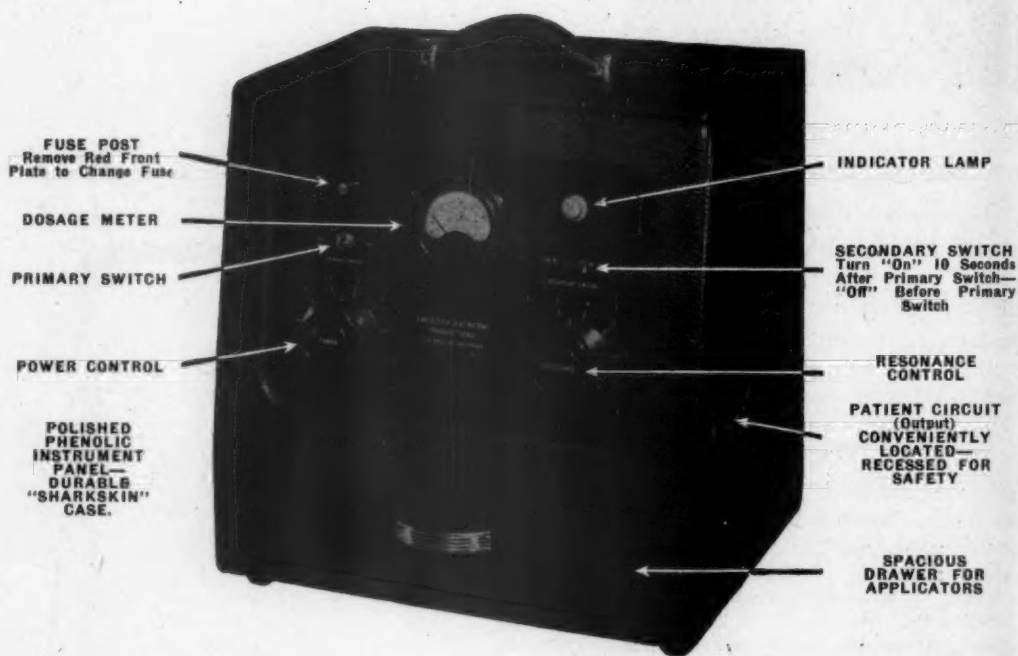
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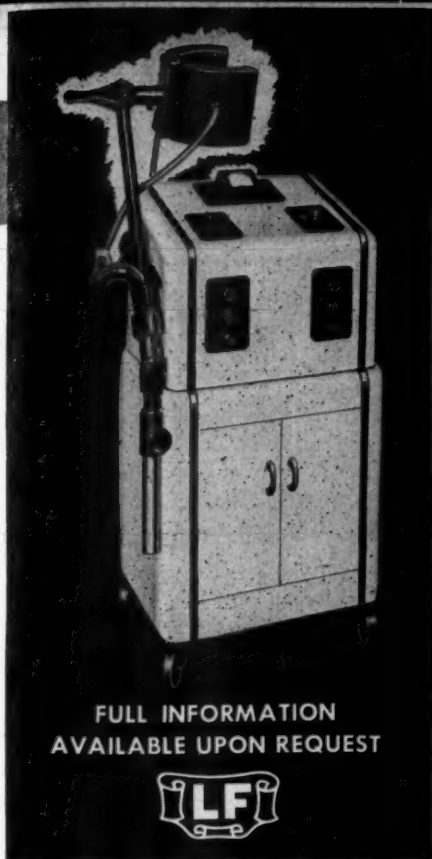
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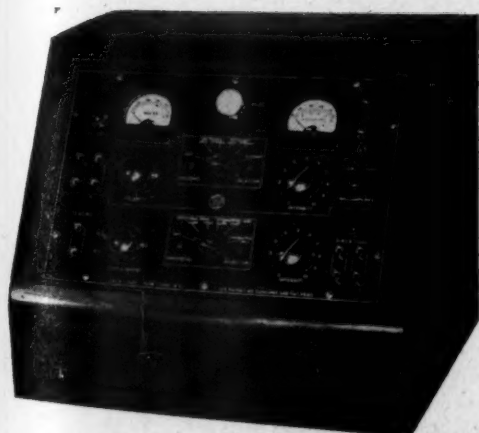
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APPROVED SCHOOLS FOR PHYSICAL THERAPY TECHNICIANS Council on Medical Education and Hospitals of the American Medical Association

Regular Course

Name and Location of School	Medical Director	Technical Director	Entrance Requirements*	Length in Months	Classes Start	Tuition	Diploma, Certificate, or Degree
Children's Hospital, Los Angeles.....	Samuel S. Mathews	Lily H. Graham	a-b-o	12	Feb/Aug	\$200	Diploma
College of Medical Evangelists, Los Angeles ¹	Fred B. Moor	A. H. Carlson	c	12	Jan/July	\$215	Cert. or Degree
University of California Hospital, San Francisco ¹	Frances Baker	Margery L. Wagner	c	12	Mar/Oct	\$150	Certificate
Stanford University, Stanford University, Calif. ¹	Wm. H. Northway	Lucille Daniels	a-b-d ²	10	Quarterly	\$409	Cert. or Degree
Northwestern University Medical School, Chicago.....	John S. Coulter	Gertrude Beard	a-b-d	9	July/Oct	\$200	Certificate
State University of Iowa Medical School, Iowa City.....	W. D. Paul	Olive Farr	b-c	12	Dec	None	Certificate
University of Kansas School of Medicine, Kansas City ¹	Gordon M. Martin	Ruth Monteith	a-b-c ³	10	Feb/Sept	\$59 ⁴	Cert. or Degree
Bouvé-Boston School of Physical Education, Boston.....	Arthur L. Watkins	Constance K. Greene	c ³	36	Sept	\$400 yr.	Degree
Harvard Medical School, Boston.....	Frank R. Ober	Janet B. Merrill	a-b-d	9	Varies	\$300	Certificate
Boston University, College of Physical Education for Women, Sargent College, Cambridge, Mass.....	Louis Howard	Adelaide L. McGarrett	H.S.	36	Oct	Varies	Degree
University of Minnesota, Minneapolis ¹	Miland E. Knapp	Sara E. Kollman	a-b	12	June-Sept	Varies	Cert. or Degree
Barnes Hospital, St. Louis.....	F. H. Ewerhardt	Beatrice F. Schulz	a-b	9	Oct	\$200	Certificate
St. Louis University School of Nursing St. Louis ¹	Alex. J. Kotkis	Sr. M. Imelda	a-b-c ³	9	Sept	\$250 yr.	Cert. or Degree
Columbia University, New York City ¹	Wm. B. Snow	Josephine Rathbone	a-b-c	10	Feb/Sept	\$480	Certificate
New York University School of Education, New York City ¹	Geo. G. Deaver	Elizabeth Addoms	a-b-c	9	Sept	\$450	Cert. or Degree
Duke Hospital, Durham, N. C. ¹	Lenox Baker	Helen Kaiser	a-b-c	12	Oct	\$200	Certificate
D. T. Watson School of Physiotherapy, Leedsdale, Pa. ¹	Jessie Wright	Kathryn Kelley	a-b-d	12	Oct	\$200	Diploma
Graduate Hosp. of the Univ. of Pennsylvania, Philadelphia ¹	Geo. M. Picrsol	Katharine S. Sutherland	a-b-c	12	Sept	\$200	Certificate
University of Texas School of Medicine, Galveston ¹	G. W. N. Eggers	Ruby Decker	a-b-c	9	Jan.	\$100 ⁴	Certificate
Baruch Center of Physical Medicine and Richmond Professional Institute, Richmond, Va. ¹	F. A. Hellebrandt	Josephine J. Buchanan	a-b-c	12	Sept	\$200 ⁴	Cert. or Degree
University of Wisconsin Medical School, Madison ¹	Elizabeth Grimm	Margaret A. Kohli	a-b-c	9	Sept	Varies	Certificate

* Courses are so arranged that any of the entrance requirements will qualify students for training. a = Graduation from accredited school of nursing; b = Graduation from accredited school of physical education; c = Two years of college with science courses; d = Three years of college with science courses; e = Coll. deg., science; H. S. = High school graduation.
† Also six-month emergency course.

1. Male students admitted.
2. High school graduates accepted for four-year course leading to A.B. degree; students admitted quarterly and tuition is \$143 per quarter.
3. High school graduates admitted to four-year college course.
4. Non-residents charged additional fee.

APPROVED SCHOOLS FOR OCCUPATIONAL THERAPY TECHNICIANS

Council on Medical Education and Hospitals of the American Medical Association *

NOTE: The duration of the course is expressed in academic years and in most schools the accelerated curriculum is being followed.

Name and Location of School	College Affiliation	Duration of Course	Classes Start	Entrance Requirements	Tuition Per Year	Certificate, Diploma, Degree	Graduates in 1944
University of Southern California, 3551 University Ave., Los Angeles	University of Southern California	2 yrs. 5 yrs.	Fall term Every semester	College deg. High sch.	\$330 \$330	Certificate } B.S. & Cert.	3
Mills College, Oakland, Calif.	Mills College	5 yrs.	FebSept	High sch.	\$475	Cert. & Deg.	None
San Jose State College, San Jose, Calif.	San Jose State College	3 yrs.	Every quarter	1 yr. coll. High sch.	\$21 \$21	Certificate } Degree	5
University of Illinois College of Medicine, 1853 W. Polk St., Chicago	University of Illinois	4½ yrs.	Varies	High sch.	\$80	B. S.	None
University of Kansas, Lawrence	University of Kansas	4½ yrs.	Every semester	High sch.	\$25	B. F. A. & Cert.	1
Boston School of Occupational Therapy, 7 Harcourt St., Boston	Tufts College	3 yrs. 5 yrs.	Varies Sept	1 yr. coll. High Sch.	\$400 \$400	Diploma Diploma & Deg.	58
Kalamazoo School of Occupational Therapy, Western Michigan College of Education, Kalamazoo	Western Michigan College of Education	3 yrs.	FebOct	1 yr. coll.	\$76 ¹	Dipl. & B. S.	14
Michigan State Normal College, Ypsilanti	Michigan State Normal College and Univ. of Michigan	5 yrs.	SeptFeb June	High sch.	\$67	Cert. & Deg.	7
St. Louis School of Occupational and Recreational Therapy, 4567 Scott Ave., St. Louis	Washington University	3 yrs.	Oct	2 yrs. coll.	\$350	Dipl. & Deg.	17
Columbia University, 630 W. 168th St., New York City	Columbia University College of Physicians and Surgeons	3 yrs.	FebSept	2 yrs. coll.	\$380	Cert. & B. S.	23
New York University School of Education, 100 Washington Sq. E., New York City	New York University	4½ yrs.	Quarterly	High sch.	\$475	Cert. & B. S.	4
Ohio State University, Columbus	Ohio State University	4½ yrs.	Quarterly	High sch.	\$75	Degree	3
Philadelphia School of Occupational Therapy, 419 S. 19th St., Philadelphia	University of Pennsylvania	3 yrs.	Nov.	1 yr. coll.	\$400 ² \$400 ³	Diploma } Degree	65
Richmond Professional Institute, 901 W. Franklin St., Richmond, Va.	College of William and Mary	3 yrs.	FebSept	1 yr. coll.	\$220	Certificate	5
Milwaukee-Downer College, Dept. of Occupational Therapy, 2512 E. Hartford, Milwaukee 11	Milwaukee-Downer College	3 yrs. 5 yrs.	Sept Sept	1 yr. coll. High sch.	\$250 \$250	Diploma } B. S. & Diploma	26
Mount Mary College, 2900 Menomonee River Dr., Milwaukee	Mount Mary College	5 yrs.	Sept	High sch.	\$210	Certificate	7
University of New Hampshire, Durham, N. H.	Univ. of New Hampshire	4½ yrs.	SeptFeb	High sch.	B. S. Degree	None
University of Toronto, Dept. of University Extension, Toronto, Ont., Canada	University of Toronto	3 yrs.	Sept	1 yr. coll.	\$188	Diploma	34

1. Non-residents charged additional fee.

2. \$400 per yr. for each of first two years; \$200 for third yr.

3. \$400 per yr. for each of first four years; \$200 for fifth yr.

* Reprinted in part J. A. M. A. 127:848 (March 3) 1945.



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OPPORTUNITIES

WANTED — PHYSICAL THERAPISTS FOR THE FOLLOWING: (a) Department of physical therapy, 12-man group; winter resort town, Southwest. (b) To take full charge of department in 250-bed general hospital; treatments average 10,000 annually; middle western metropolis. (c) To take charge of department, one of the leading hospitals in the Chicago area; man or woman. (d) To take charge of department of large hospital located in the Detroit area. (e) To become associated with 15-man clinic; all specialties represented; preferably some one particularly well qualified in administering fever therapy; Rocky Mountain area. (f) Chief physical therapist; small hospital for crippled children; institution has own farm and dairy; beautiful location, South; \$3600, complete maintenance. (g) Consultant in physical therapy, crippled children's division of organization, state department of public welfare; duties consist of direct treatment to children in four hospitals as well as consultant service to public health and hospital nurses including supervising physical therapist; salary, \$2400-\$2800.

WANTED — Physician qualified in physical medicine to organize and direct department of physical therapy, 10-man clinic having large compensation and orthopedic service.

SITUATIONS WANTED

Physician, well qualified and experienced in physical medicine; Veteran World War II; four years, director of physical therapy and physical therapy department, large teaching hospital; military service confined to directing department of physical medicine.

For further information, please write,
BURNEICE LARSON, Director, Medical Bureau,
Palmolive Building, Chicago 11.

The Silver Anniversary year of the National Society for Crippled Children and Adults marks the thirteenth annual sale of Easter Seals for crippled children as a special occasion.



Services to the crippled are supported by voluntary contributions to the state Societies during the month before Easter, by the purchase of Easter Seals. Based on valid, unfilled need, these services are for crippled persons of all ages, races and creeds. Funds are used for services which do not duplicate the work of other private or public agencies.

AMERICAN CONGRESS OF PHYSICAL MEDICINE SPRING SESSION EASTERN SECTION

In Conjunction with the New York Society of Physical Medicine and
the Pennsylvania Academy of Physical Medicine

SATURDAY, APRIL 13, 1946

WALTER REED GENERAL HOSPITAL

WASHINGTON, D. C.

Morning Session — 9:00 A. M.

Registration followed at 9:30 by orientation talk by Lieut. Col. Ben Boynton, M.C.,
A. U. S. Tours in small groups will be shown the entire program for physical medicine.
There will be explanatory demonstrations and discussions.

Luncheon — 12:30 Noon

May be secured on hospital grounds at personal expense.

Movies:

During Luncheon interim several movies will be shown.

Afternoon Session — 2:00-5:00 P. M.

Message of Welcome: Commanding Officer, Walter Reed General Hospital.

The Place of Neostigmine in the Therapy of Chronic Arthritis.

HERMAN KABAT, M.D., Washington, D. C.

Problems of Arthritis Treated by Physical Medicine.

HARRY KESSLER, Major, M.C., Bronx, N. Y.

Causalgia and Its Treatment.

KARL HARPUDER, M.D., New York, N. Y.

Rapid Rehabilitation Following Hand Injuries.

HAROLD LEFKOE, M.D., Philadelphia.

Modern Physiologic Concepts of Spinal Cord Function and Poliomyelitis.

ERNST FISCHER, M.D., Richmond, Va.

A Consideration of Certain Physiologic and Kinesiologic Principles That Are Frequently Neglected in the Application of Therapeutic Exercise.

COMDR. CHARLES D. GIAUQUE, U. S. N. R.

Evening Session — 7:00-10:00 P. M.

Banquet:

Hotel Lee Sheraton, 15th and L Streets, N. W., Washington, D. C. 7:10 P. M.
(Reservations at \$2.50 per person should be mailed no later than April 10 to Isadore Levin, M.D., Doctors Hospital, Washington 6, D. C.)

Program:

High Lights of Physical Therapy as Seen at Walter Reed General Hospital, 1941-45.

DONALD L. ROSE, Major, M.C., Washington, D. C.

The Future of Physical Medicine in the Navy.

HOWARD H. MONTGOMERY, Capt. (MC), U. S. N.

PROGRAM COMMITTEE

G. J. P. BARGER, M.D.,
Chairman, Eastern Section

BEN BOYNTON, Lieut. Col., M.C.,
Walter Reed General Hospital

HARRY S. ETTER, Comdr. (M.C.), U. S. N.

THIS MEETING IS OPEN TO PHYSICIANS AND THEIR GUESTS

MEETINGS OF INTEREST TO THOSE IN THE FIELD OF PHYSICAL MEDICINE

In these columns will be published information about meetings of interest to those in the field of physical medicine. New data should be sent promptly to the office of the Secretary, 2 E. 88th St., New York 28, N. Y.

American Congress of Physical Medicine, 24th Annual Session, Hotel Pennsylvania, New York, September 4, 5, 6 and 7, 1946; **Instruction Course** to be held during the meeting; Dr. Richard Kovács, 2 East 88th Street, New York 28, Secretary. See announcement elsewhere this issue.

Eastern Section, American Congress of Physical Medicine, Walter Reed General Hospital, Washington, D. C., Saturday, April 13. Dr. G. J. Barger, 1125 Buchanan Street, N. W., Washington 11, D. C., Secretary.

Midwestern Section, American Congress of Physical Medicine, Chicago, Illinois. Watch for announcement of date and program. Dr. C. O. Molander, Michael Reese Hospital, Chicago, Secretary.

National Rehabilitation Association, Hotel La Salle, Chicago, Illinois, May 13, 14 and 15, 1946. Mr. H. Earle Correvont, Director of Vocational Rehabilitation for Michigan, Chairman of Program Committee.

New York Society of Physical Medicine; meetings on first Wednesday, from October to May, New York City; Dr. Madge C. L. McGuinness, 51 East 87th Street, New York 28, Secretary.

The Pennsylvania Academy of Physical Medicine; meetings at the Philadelphia County Medical Building, 21st and Spruce Streets. For 1946 schedule inquire of Secretary, Dr. Harold Lefkoe, 1824 Spruce Street, Philadelphia 3.

Southern California Society of Physical Medicine, Secretary-Treasurer, Dr. Clarence Dail, 802 Acacia Street, San Gabriel, Calif.

National Council on Rehabilitation; Fourth Annual Meeting, Ritz-Carlton Hotel, New York City, April 24 and 25, 1946; Executive Director, Chauncey S. Truax, 1790 Broadway, New York 19, N. Y.

American Physiotherapy Association, Annual Conference, June 16 to 22, 1946, Blue Ridge, N. C. Mildred Elson, Executive Secretary, 1790 Broadway, New York 19, N. Y.

American Occupational Therapy Association, Congress Hotel, Chicago, August 11 to 15, 1946. Mrs. Meta R. Cobb, Executive Secretary, 33 West 42nd Street, New York 18, N. Y.

WANTED — BACK ISSUES OF THE ARCHIVES

September, 1944
January, 1945
February, 1945
March, 1945

**American Congress
of Physical Medicine
30 North Michigan Avenue
Chicago 2, Illinois**

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SAVINGS
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INSTRUCTION COURSE

In Conjunction with the

24th Annual Scientific and Clinical Session

AMERICAN CONGRESS OF PHYSICAL MEDICINE

September 4, 5, 6, 7, 1946

HOTEL PENNSYLVANIA

NEW YORK, N. Y.

Watch May issue of *ARCHIVES* for announcements of subject matter for the instruction course given in conjunction with the twenty-fourth annual covention of the American Congress of Physical Medicine.

New subject matter — with emphasis on basic sciences.

Functional anatomy.

New developments.

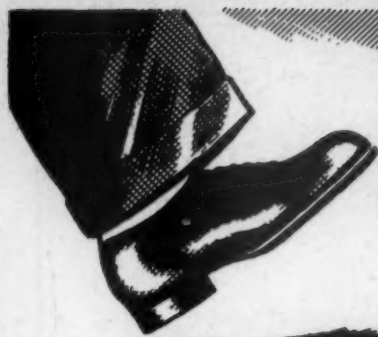
The course is intended primarily for physicians, but a limited number of the members of the American Registry of Physical Therapy Technicians will also be admitted.

For information and application form address

AMERICAN CONGRESS OF PHYSICAL MEDICINE

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